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PETROLEUM WEEK

A McGRAW-HILL PUBLICATION

Is sufficient spot crude available? 15

In-situ test follows waterflood 27

319,234 b/d

That's the volume of trades in import quotas – 35% of the crude allocation.

2/3 of the importers swap off 100% of their quotas.

... page 16

Drilling pace quickens in Montana's Tule Creek ... 34

Pipeline river crossings are getting easier 45

Hydrogen needs growing faster than supply 53

Soviet oil via Italy makes Common Market fret ... 68

Price 50 Cents

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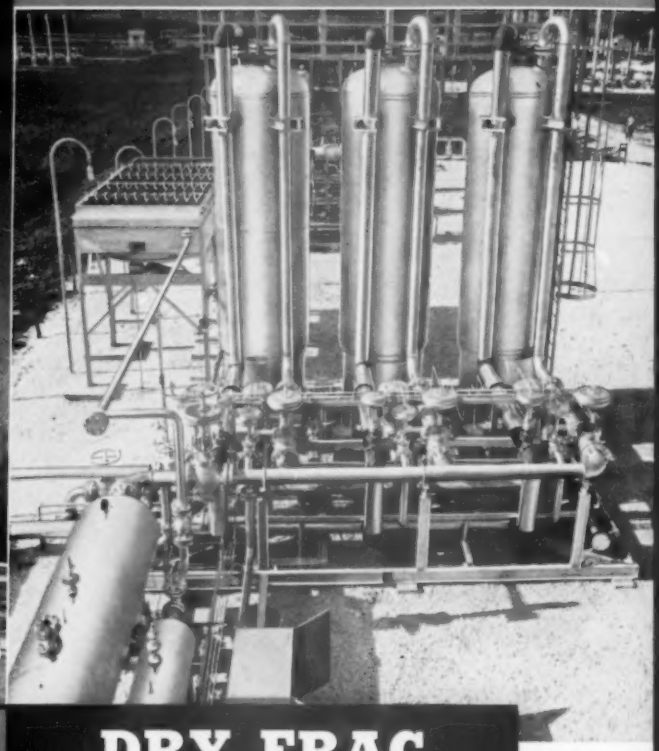
Rich Stream -- Lean Stream



COLD FRAC **DRY FRAC**

Different processes - one objective: PAYOUT!

Although the BS&B COLD FRAC and DRY FRAC processes and equipment are entirely different, both will dehydrate gas and recover hydrocarbon liquids while operating on an unattended basis. How, then, can you determine which process will give the best results for a specific application?

Generally, the COLD FRAC process is favored for use on a stream rich in C_3+ hydrocarbons. Variable design factors such as separation temperature, partial stripping of fluid, and balancing of the process to utilize equipment to its maximum capacity greatly affect the economics of this process, but it is not affected to any great degree by inlet temperature.

The DRY FRAC process is highly effective on streams with a low C_3+ GPM. Its efficiency is less affected than that of COLD FRAC by the composition of the wellstream, but it will recover a higher percentage of available pentanes from wellstreams of lean composition.

In addition to economic factors, there are other factors including flow rate, utilities, GPM, pressure and inlet temperature which should be taken into account before a selection of the process is made.

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Ask your local representative for full information or write to Black, Sivalls & Bryson, Inc., Dept. I-EU3, P. O. Box 1714, Oklahoma City, Oklahoma.

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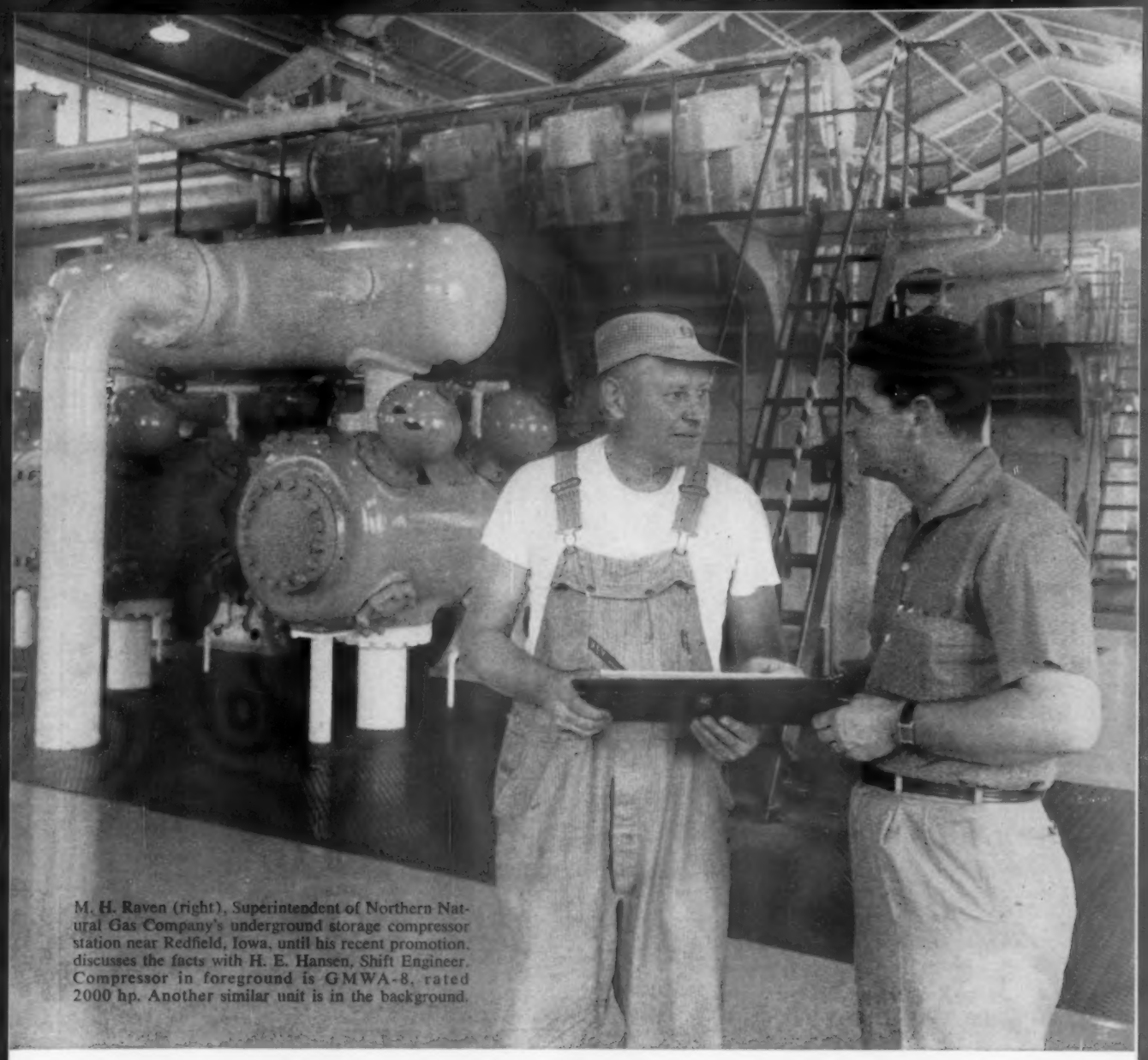

M. H. Raven (right), Superintendent of Northern Natural Gas Company's underground storage compressor station near Redfield, Iowa, until his recent promotion, discusses the facts with H. E. Hansen, Shift Engineer. Compressor in foreground is GMWA-8, rated 2000 hp. Another similar unit is in the background.

How a rugged two-cycle compressor aids a variable-load gas storage program

During its first year's operation, Redfield Station of Northern Natural Gas Company has been put through a rigorous test. According to M. H. Raven, Superintendent, "Our Cooper-Bessemer GMWA-8 Compressor and En-Tronic Control have responded round-the-clock to this program of normal loading, underloading and overloading with remarkable performance. Despite abnormal loading, oil consumption and water usage have been very low. Inspection and cleaning after 12,000 hours showed all parts in perfect condition. It is a *rugged* machine!"

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This great "team" of wire line pipe recovery tools will save you time, pipe and money – help you net more profit from your drilling or remedial operations.

These tools are fast and efficient, enabling you to recover a maximum amount of free pipe before resorting to washover and mechanical fishing operations. Even during washover operations, their use assures you of the fastest most economical recovery of the balance of the stuck pipe.

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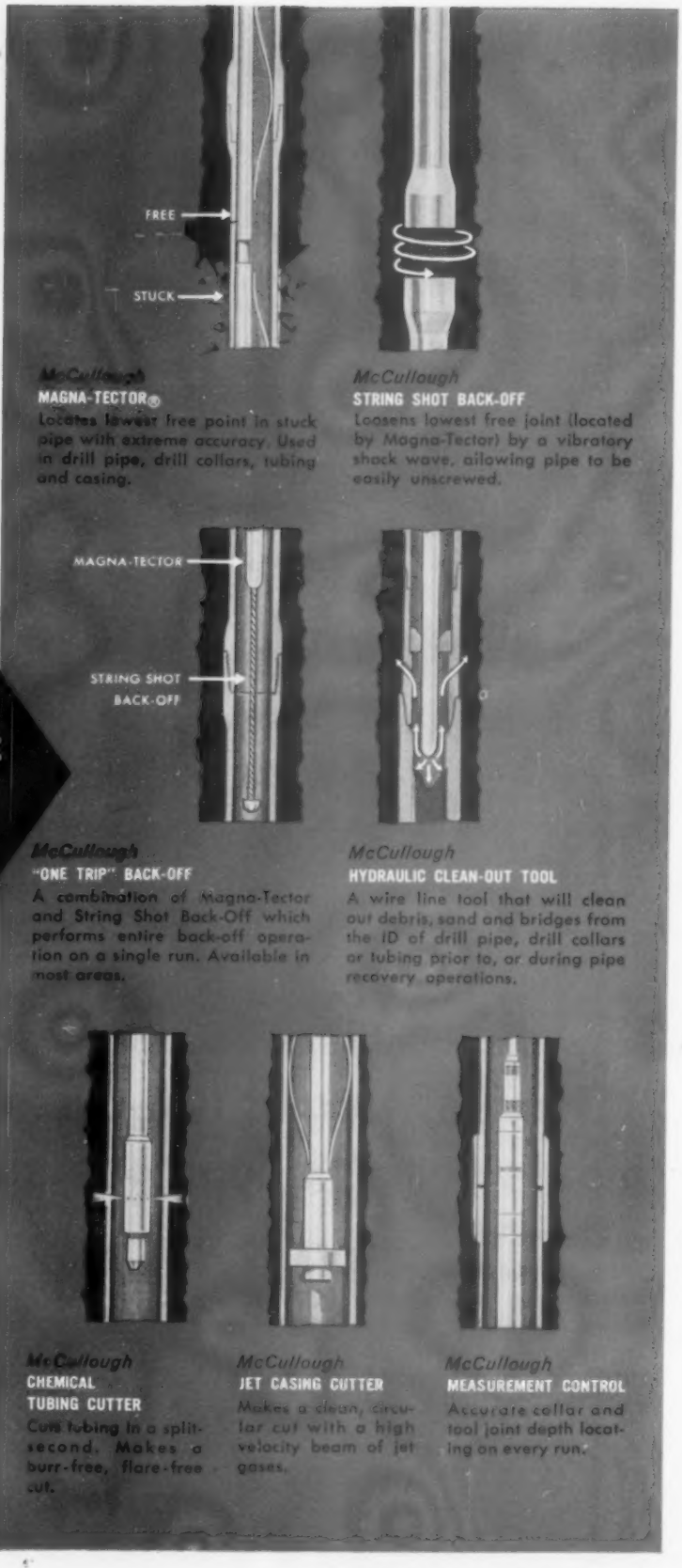

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INSIDE *Slant*

AN EVEN BETTER PW

It's gratifying to write these few words to you.

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PETROLEUM WEEK was started almost six years ago as a new concept in communication service.

This new approach is being carried a step further through the addition of four more buff pages, which we, of Oil's Most Readable Magazine, call flash pages.

These pages for faster reading include What's New In Industry, Looking Ahead in Washington, Company Developments (a completely new department), and The Market Place, in addition to the original ones.

These are: 60-Second Summary, Up to the Minute, Fingertip Figures, and The Market Trend.

You'll also notice a completely new look for the Fingertip charts, which now show weekly rather than monthly averages.

And, in addition, several of the departments have been expanded, and the index pinpoints the more urgent pages.

We of PETROLEUM WEEK are sure you'll like it.

LeRoy Menzing
EDITOR

Congrats and $25 for this quip to DEAN H. CROWELL, 5919 Vickery Boulevard, Dallas, Texas

Joe Roughneck's seen dusters in his day, but he's brought in many a producing well, too. And throughout the years, Joe's been the one to specify Lone Star API pipe. He knows it's tough, dependable and available conveniently in the heart of the oil country.

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Views Tha

What Rule 62 Means

Dear Sir:

In your story "Backers Say Case Is Strong" [PW—Feb.3'61,p16], regarding the Tennessee Gas Transmission-Edison proposal to bring gas from Texas via Mexico into California, it says in part:

"Since Southern California Edison is required by the Los Angeles air pollution control ordinance to burn gas six months of the year, [lawyers] will argue. . ."

This statement is quite misleading. It implies that Edison has no alternative to the burning of gas during the six months, when, as a matter of fact, Edison and all other industrial users of fuel in Los Angeles County must burn gas ONLY if it is available.

Rule 62, the pertinent regulation of the Los Angeles County Air Pollution Control District (not exactly an ordinance either, but to differentiate might be to split hairs) bans the burning of fuel oil during the period May-October if the alternate fuel, natural gas, is available, but permits the burning of fuel oil if natural gas is not available.

The crux of the matter, then, is the availability of gas. . . .

By the terms of Rule 62, no industry in Los Angeles County could be shut down if gas were not available, since the rule would, under that circumstance, permit the free and unrestricted use of fuel oil.

It is true that the natural gas utilities, and now the Southern California Edison Co., in proceedings before various regulatory commissions, have left the impression that they are under some sort of obligation, in light of the enactment of Rule 62, to secure greater quantities of natural gas. Rule 62 creates no such obligation. It does not say to Edison or to the gas utilities: "Go get additional supplies of gas or you and your industrial consumers will be without fuel for six months of the year."

Rather, it says to industrial users: "You must burn gas during six months of the year if, but only if, it is available."

Rule 62 as written is nonsensical. Smog in the Los Angeles Basin is basically the result of atmospheric and topographical conditions peculiar to the Basin. It can occur at any time of the year, and its occurrence can be predicted with a high degree of ac-

Make News

curacy. There are many days during the summer months when it does not occur, and there are also days during the winter months when it does occur; yet Rule 62 by itself does not allow burning of fuel oil (if gas is available) during non-smoggy days of the summer, and does not prohibit the burning of fuel oil in the winter even on the smoggiest day.

Hence the effort of the oil industry in California to secure the amendment of the rule so that it would permit the industrial user freely to choose his fuel throughout the year except on those days when smog is predicted. . . .

Thus the competition between gas and fuel oil would be preserved, effective control over the burning of fuel oil would be maintained, and the public interest would be better served.

STARK FOX
Executive vice-president
Oil Producers Agency of California

A Fair Shake on Taxes

"Auto users do not get a fair shake when their tax money is diverted to nonroad purposes, and still more gasoline taxes are piled on."

—EUGENE HOSFORD
Chairman
Texas Oil Information Committee
Dallas

Kiddie Car Highways?

"There is every likelihood that we may wake up some day soon with the world's finest highway system and nothing on it but kiddie cars."

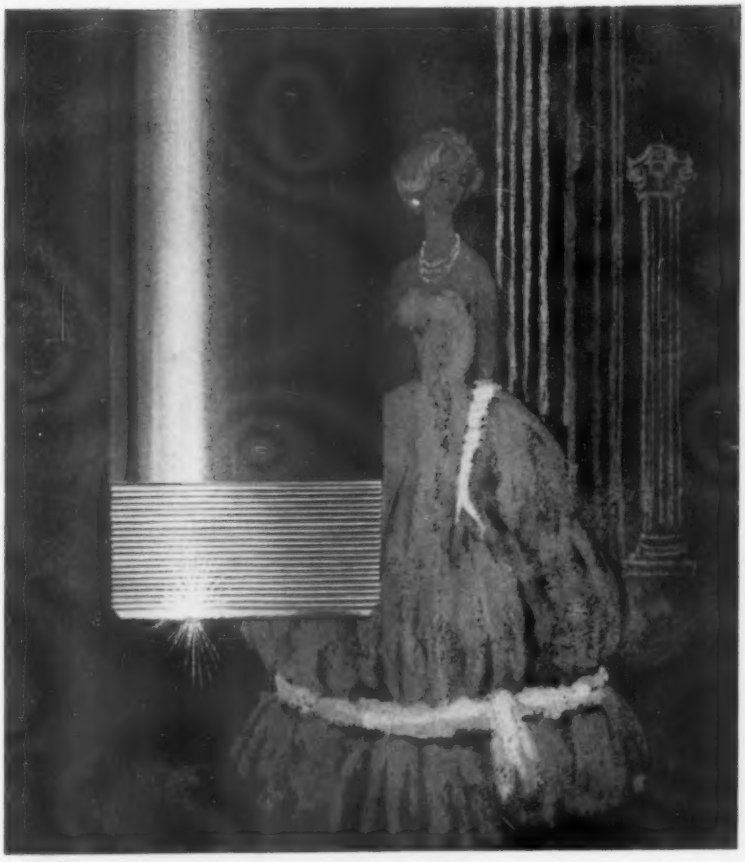
—FREDERICK B. HUFNAGEL, JR.
Assistant to the marketing vice-president
Sun Oil Co.

A Trend in Profits

"Petrochemical profits made a substantial contribution to Sinclair's earnings for the first time in 1960. Whereas they contributed very little to net income in 1959, they accounted for 8% to 10% of income in 1960. This should be an accelerating trend."

—HARRY JEFFRIES
Chairman, finance committee
Sinclair Oil Corp.

PETROLEUM WEEK *will publish reader comments each week. Address letters to LeRoy Menzing, Editor,* PETROLEUM WEEK, *330 W. 42nd St., New York 36, N. Y.*



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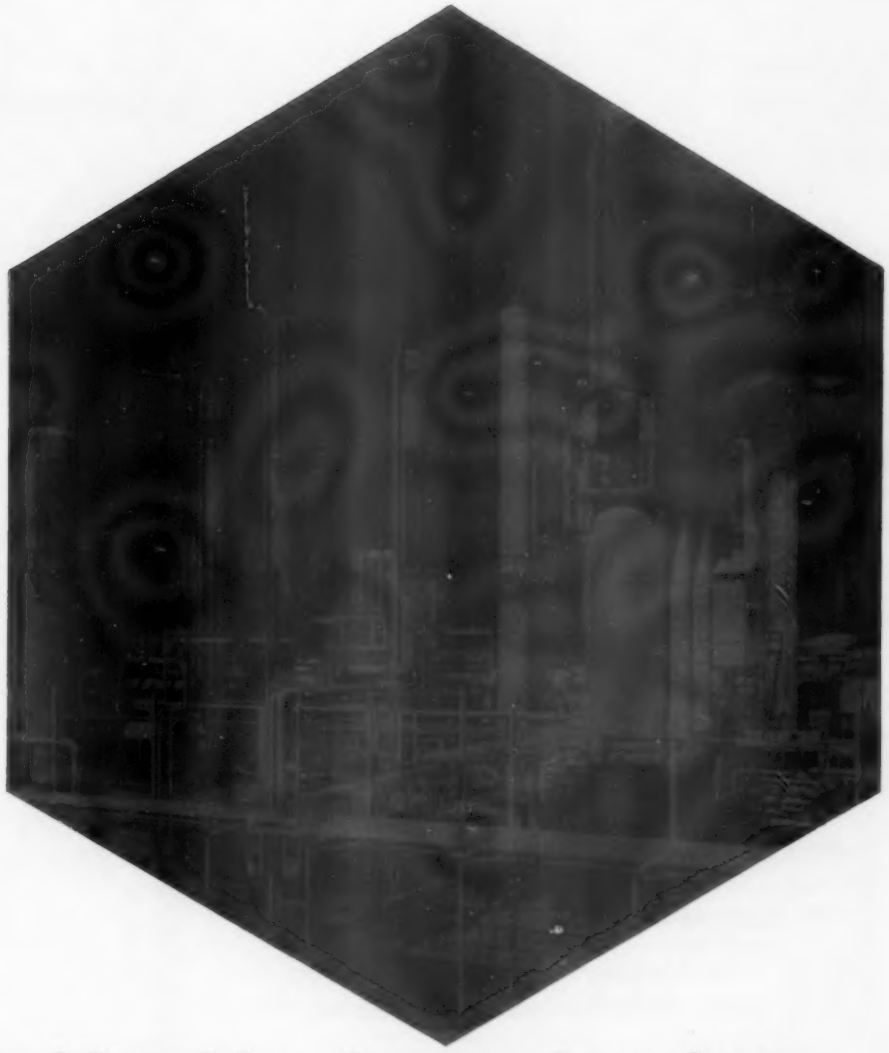

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The UOP-developed "HF" Alkylation process combines olefins such as propylenes, butylenes and amylenes with an isoparaffin, usually isobutane. The product formed, alkylate, is a mixture of branched chain hydrocarbons of higher molecular weight. It is widely used in producing high octane aviation gasoline, as well as an anti-rumble component in motor fuel.

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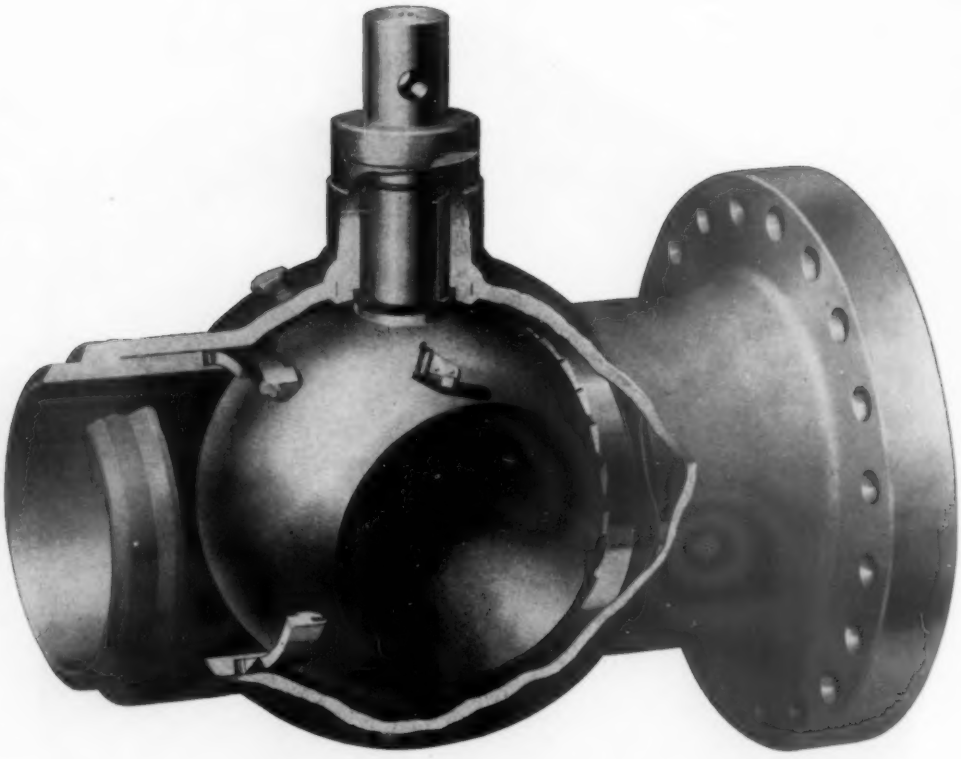

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They can be supplied in any material, size 2″ or larger to required working pressures and with any type or style of operator desired. The Cameron Ball Valves can be delivered from factories located in United States, Canada, Mexico, England and France.

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60-Second Summary

THE WEEK'S MOST IMPORTANT DEVELOPMENTS

PETROLEUM WEEK

March 10, 1961

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The Federal Power Commission's area pricing policy on gas may have rough going before it gains general acceptance. That much became obvious at hearings in Midland, Tex., this week. FPC won no friends among producers when it banned "indefinite" price clauses (page 19) before the hearings started. . . . p. 17

•

Some suppliers say 30,000 b/d to 40,000 b/d of crude are going begging, while a few buyers claim they are short of oil. The confused situation may become an issue at next week's Texas Railroad Commission hearing in Austin. . . . p. 15

•

Where to get supplemental supplies of hydrogen may soon become a real problem for refiners. So many processes now call for hydrogen that sources other than catalytic reforming may have to be developed. . . . p. 53

•

In-situ combustion as a means of tertiary recovery from a watered-out reservoir is being tested by Sinclair Oil & Gas Co. Sinclair is particularly interested in the economics of the method. . . . p. 27

•

There's a likelihood that exploration will take an upturn in Tunisia. One Italian and two American firms are seeking new acreage. . . . p. 70

•

Venezuela has sent a strongly worded memo to the Kennedy Administration about import controls. And it isn't happy, either, with crude quotas for inland refineries and the swapping game (page 16) that's resulting. . . . p. 24

•

Montana's Tule Creek area is still generating a lot of talk and activity. And operators generally are "loosening up" on information about finds and prospects. . . . p. 34

•

It isn't as tough as it used to be to make a pipeline river crossing. Transcontinental Gas Pipe Line Corp. finished one line across the Mississippi in one-third the time it used to take. . . . p. 45

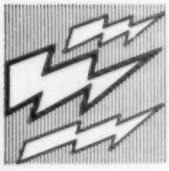
•

The Common Market countries are stewing over the idea of a flood of Italian products refined from Soviet crude. They're soliciting answers from each other on legal conditions regulating oil imports. . . . p. 68

•

Encouraging results are being obtained in a secondary recovery process that involves an electrical "hot-foot." The process is designed particularly for very viscous oils that technically are nonproducible. . . . p. 37

Up to the Minute



SIGNIFICANT LATE NEWS

PETROLEUM WEEK

March 10, 1961

Residual import allocations on the East Coast will go on an annual basis starting Apr. 1, with the first quota set at a maximum of 461,427 b/d. All future allocations will be based on Bureau of Mines estimates. A sliding-scale formula for allocations will be set to allow "fuller participation by newcomers with deepwater terminals." Quotas to historical importers will decline by a "fixed proportion" each year. Interior Secretary Udall says the Eisenhower plan gave a "favored position" to a few large firms.

•

Shell Oil Co. has made a processing deal with Hess Trading & Transport, Inc., involving 25,000 b/d of crude. Shell, which does not have an East Coast refinery, will furnish Louisiana crude to Hess's Sewaren (N.J.) refinery for processing into products for Shell's eastern markets. The 71,250 b/d Hess refinery was revamped last year to add more gasoline finishing capacity.

•

The Enco brand sign will be used by Humble Oil & Refining Co. from Illinois to the West Coast starting May 12. Enco will replace Humble, Oklahoma, and Pate at all dealer stations, except in Texas. Humble will appear on the stations there, but the gasoline brand will be Enco.

•

The ten-year-old West Coast antitrust suit ended this week with dismissal of charges against the last of seven defendants, Texaco Inc. U.S. District Judge James M. Carter, of San Diego, granted a stipulation for dismissal without prejudice, submitted by the Justice Dept. and signed by Texaco. The government said it had "concluded that insufficient benefits to the public would be likely to result from a lengthy and expensive trial." Six other defendants accepted consent-decree settlements in June, 1959.

•

The Texas Supreme Court upset a Railroad Commission proration formula this week based on two-thirds acreage and one-third wells. The case involved a small tract in the Normanna field of Bee County. The court held that the formula gave the operator more gas than he was entitled to. It reversed the Hawkins ruling, which held that an operator was entitled to a "reasonable profit."

•

Reed Roller Bit Co.'s top management changed this week, with former president John M. Maher returning as chief executive. Maher, who had been president until last November, replaced Ray O. Shaffer, who resigned as president and chairman. The latter position will be left vacant for the present. The change occurred after Houston oil man John Mecom teamed with Maher to purchase several large blocks of Reed stock, including those held by John H. Blaffer, A. H. Rowan, Shaffer, and the Farish interests. Mecom and Maher reportedly hold more than 200,000 of the 681,500 shares outstanding, which enabled them to block the proposed merger into Dresser Industries, Inc.

If you formulate or use paraffin coatings...

Charts like these have been plotted for 18 ternary (3-component) systems containing two Epolene resins (E-10, E-11, E-12, N-10, N-11, N-12, C-10) and a standard 130° AMP paraffin. In each system, the tensile strength and adhesion ratings are given for combinations of the two Epolene resins varying from 0 to 2%.

Eastman can help you achieve optimum performance with the right blend of polyolefin modifying resins

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To aid you in obtaining optimum properties for specific paraffin coating applications, Eastman offers seven basic types of low-molecular-weight polyolefin resins.

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Eastman low-molecular-weight polyolefin resins

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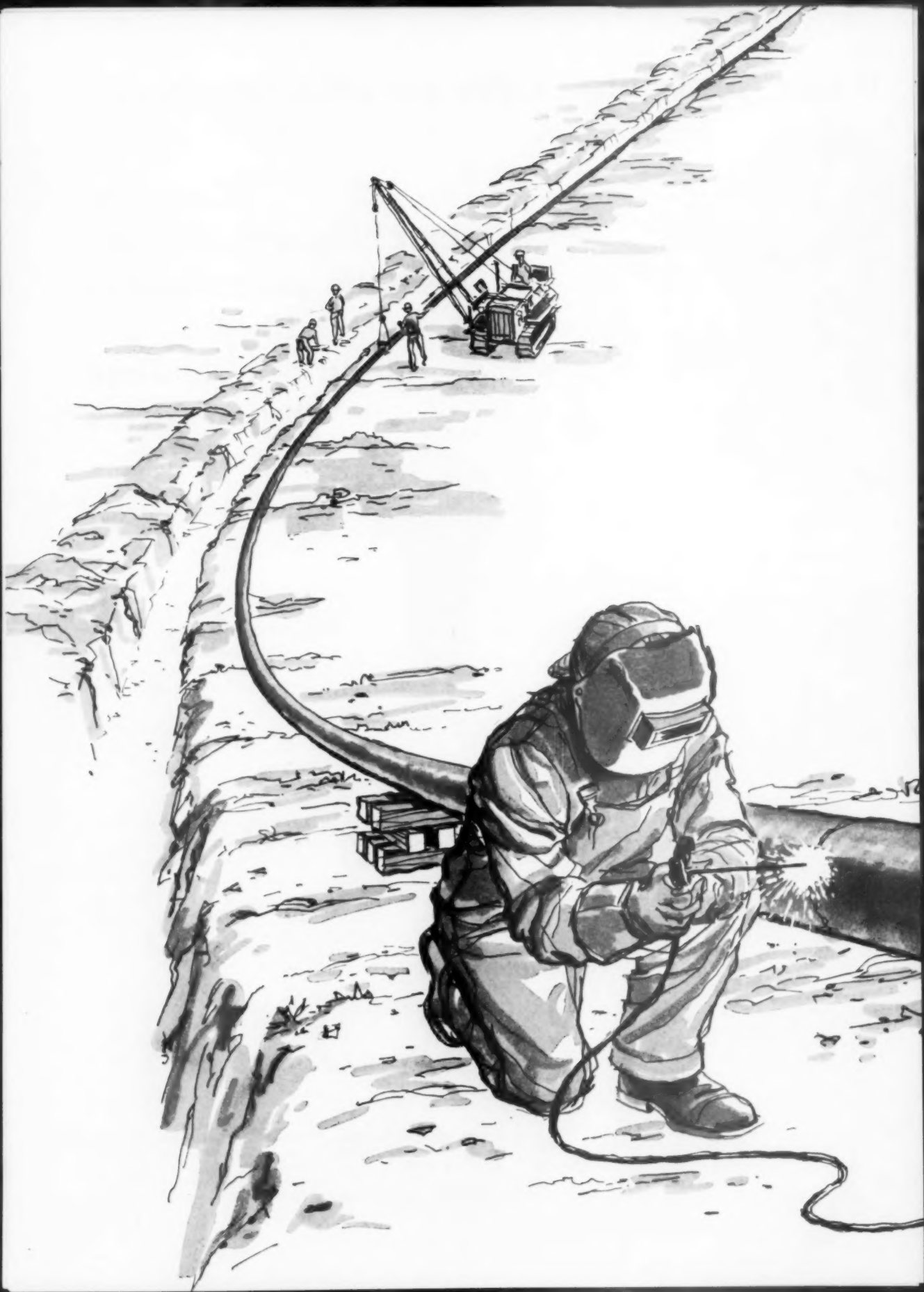

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Made from prime, flat-rolled steel, Republic Electric Resistance Weld is easier to bend . . . easier to line up . . . easier to weld. Flat-rolled tolerances improve roundness and concentricity. This pipe is uniformly ductile, straight, and strong. Smoother inside surfaces mean less friction, less turbulence.

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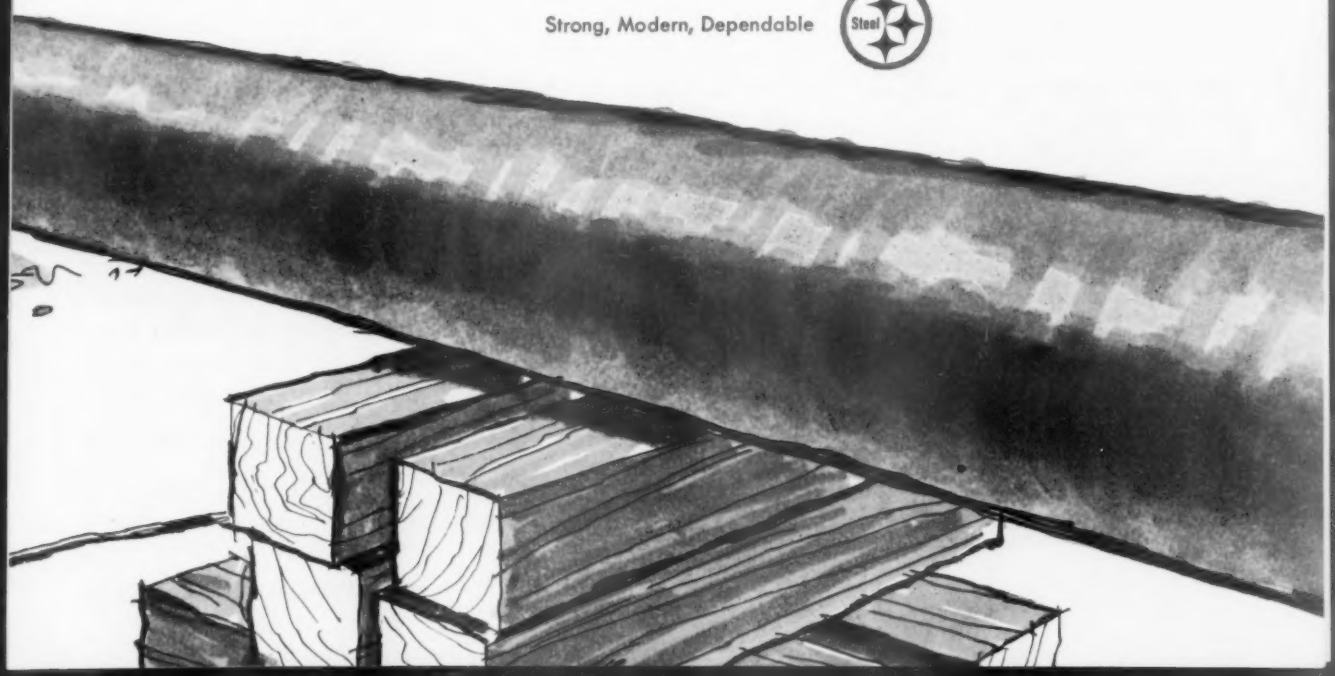
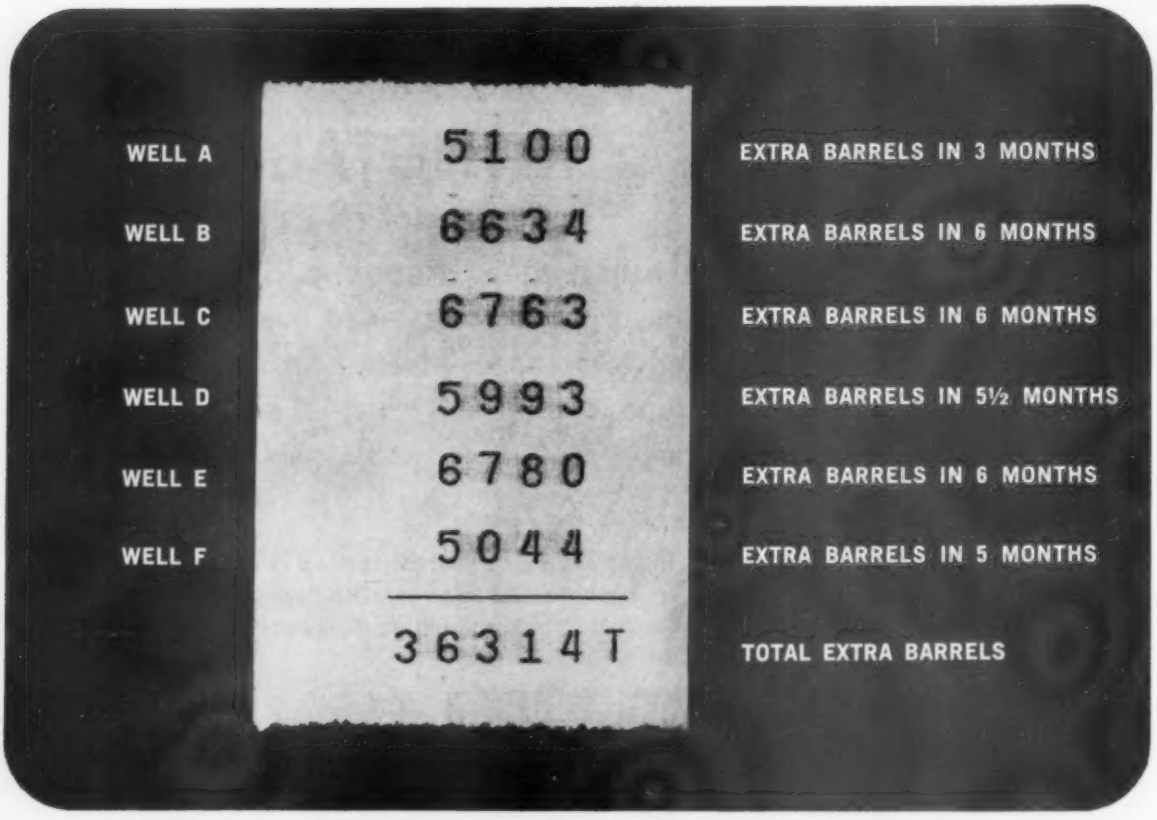


could you use production increases like these?



This operator got 36,314 barrels of extra oil from six wells within six months after they were fractured by Dowell. Total service costs for the six treatments averaged only $2931.79 per well. The extra oil produced during the first six months, as a result of fracturing, cost less than 49 cents per barrel. Additional production after the first six months will be almost clear profit.

All six wells, in Manitoba, Canada, were treated by Dowell at about the same time. All were given similar treatments in which 50,000 pounds of 20-40 mesh sand, at 2-3 pounds per gallon of lease oil, were injected into the pay zone at about 40 bpm. The production gain was determined for each well by comparing total production for equal periods immediately before and after treatment. Production periods were six months for three of the wells. Records for the other three wells covered 5½, 5 and 3 months, both before and after treatment.

Your production problem may be different from the one faced by this operator. The chances are good, however, that Dowell engineers can design a treating program to help you produce more oil at less cost per barrel.

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SERVICES FOR THE OIL INDUSTRY **DOWELL** DIVISION OF THE DOW CHEMICAL COMPANY

Crude Availability Will Be Issue

Some buyers report a shortage of spot market oil this month. But sellers claim they have 30,000 b/d to 40,000 b/d going begging for lack of a market. Texas hearing next week may settle the score.

Buyers and sellers of crude in the Southwest apparently are having some difficulty in finding each other.

For the past two weeks, at least, the buyers seeking crude and sellers with supply have failed to make connections.

Most likely, though, they will find a meeting ground at next Wednesday's statewide hearing of the Texas Railroad Commission, in Austin.

At that meeting, the top executives of the leading companies have been requested to appear and testify on their individual requirements for Texas crude. They will also submit in advance of the hearing their inventory positions of crude and the principal products.

Two companies with crude to sell have indicated that they will try to pin one reluctant buyer down. The latter has reported that it is unable to buy enough crude for its needs.

There are two or three companies presently seeking crude to meet their requirements in March. And there are other firms offering crude for spot sales.

Several companies now claim that the market has softened some recently, and that Texas, Louisiana, and New Mexico oil is available.

One crude buyer estimated this week that there are at least 30,000 b/d to 40,000 b/d available in those states. "There is sufficient crude available," he observed, "for buyers to be selective."

Among the various grades of crude reported to be available are approximately 8,000 b/d of low-cold-test, around 8,000 b/d of West Texas intermediate, and various Louisiana and New Mexico oils.

One refiner, who reported having great difficulty in obtaining sufficient crude on the spot market in recent months, says he received a spot offer of 25,000 bbl. this week of West Texas sour.

A major company representative predicts that his firm will be in a tight supply situation for the remainder of March, but after that "we'll be bulging at the seams with crude."

The availability of crude this month is attributed primarily to the ten-day producing schedule in Texas.

One crude trader in Houston commented that the 204,952 b/d increase in the March allowable was "too much and too late in the year."

Another buyer believes the higher allowable is bound to create a surplus of gasoline.

A major purchaser takes the opposite view: "I've noticed no softness in crude stocks." He says his company will be using "all the crude we have on hand."

"In fact," he adds, "we've encountered some people who are seeking crude rather than trying to sell it."

Nationwide inventories now are considerably tighter than last year. But many crude buyers are keeping a nervous eye on rising gasoline stocks, and on the high refinery runs that could mean trouble later.

U.S. crude inventories at the end of February were 25-million bbl. under 1960. And after considerably colder weather most of this winter, stocks of middle distillates are 10-million bbl. below last year.

But gasoline stocks are up 6-million bbl., with the indicated gain in February amounting to an average of nearly 350,000 b/d. Also, preliminary data indicate that refinery runs for February reached a new monthly high of more than 8.3-million b/d.

WHAT'S NEW in PETROLEUM WEEK

FASTER READING is the major aim . . .

Oil's Most Readable Magazine has been improved with four more faster-reading buff pages to highlight the latest news developments in the petroleum industry.

A SPECIAL INDEX to faster reading . . .

The departmental index on the 60-Second Summary page has been streamlined to guide readers quickly to the buff, or flash, pages of more urgent news.

NEW FINGERTIP CHARTS spot figures . . .

One of Petroleum Week's key features has been converted from a monthly to a weekly basis to provide oil men with the significant changes in statistical trends.

COMPANY DEVELOPMENTS are summarized . . .

This is a completely new feature. It presents the important news of the many individual companies in our fast-reading style.

First Half Quota Trading Amounts to

Trading in import quotas is running at a brisk pace. The trades reported so far by the Interior Dept. for the first six months of 1961 involve 35% of the import allocations in the continental U.S.

The volume of swaps that had been recorded through last week amounted to an average of 319,234 b/d of crude and unfinished oils, out of the total allocation for those raw materials of 907,217 b/d. The latter excludes crude and unfinished quotas assigned to Puerto Rico, and exempted overland imports from Canada.

With more than three months left in the first-half allocation period, chances are that the volume of trades of foreign oil for domestic crude will run much higher than has been reported to date to Interior officials.

The value of the trades made to date is approximately $54-million.

That's computed at the rate of $1 a bbl., the general average of the values involved in the transactions reported to Interior Dept. The rate is based on the differential between the values of the crudes in the trades, and the ratios of the swaps.

The values range from 80¢ a bbl. to as much as $1.15 a bbl.

The ratios range from as low as 0.68 bbl. of domestic crude for 1 bbl. of foreign, to as high as 1.9 bbl. of domestic for 1 bbl. of foreign.

Two-thirds of the companies with crude and unfinished oils allocations in the continental U.S. have traded off their full quotas.

In addition to these 99 firms in the 100% category (table, page 16), 34 other importers have traded off varying proportions of their allocations, and 28 importers have not recorded any trades so far.

Included among the no-trade companies are large importers with several refineries, as well as the smallest inland refineries, some with quotas of less than 100 b/d.

The volume included in the no-trade category amounts to an average of 233,148 b/d. The allocations still held by the larger companies most likely are not available for trading. And some of the allocations of the smaller companies may not be available either, due to previous long-term commitments.

Of the 16 companies that have taken the largest share of the quota trades from other importers, only five have not figured in trades of their own foreign oil allocations to others (table, page 17).

The 100% Club Has 99 Members

The following importers have traded 100% of their crude and unfinished oil allocations for the January-June period, as reported through last week to the Interior Dept.

Company	Volume of Swaps (Barrels Daily)
Advance Refining	306
Allby Asphalt	319
Allied Materials	276
Anchor Gasoline	115
Anderson-Pritchard	3,208
Anderson Refining	65
Arkansas Louisiana	207
Ashland Oil	11,967
Atlas Processing	1,776
Bayou State Oil	96
Bell Oil & Gas	1,952
Big West Oil	244
Bird & Son	726
Cactus Petroleum	271
Calumet Refining	210
Caminol	2,542
Century Oil	1,598
Century Refining	312
Champlin Oil & Refining	2,907
Claiborne Gasoline	146
Clark Oil & Refining	3,226
Colorado Interstate Gas	1,946
Cooperative Refinery	3,571
Cosden Petroleum	3,815
Cross (Henry H.)	351
Crown Central	3,490
Danaho Refining	396
Debco Corp.	14
Delhi-Taylor	3,946
Diamond Asphalt	73
Douglas Oil	6,612
Dow Chemical	1,944
Edgington Oil	3,018
Eddy Refining	241
Elk Refining	510
El Paso Natural	2,196
Empire Petroleum	545
Empire State Oil	401
Envoy Petroleum	798
Famariss Oil	161
Farmers Union	2,087
First City Natl. & Pontico	6,173
Fletcher Oil	3,458
Frontier Refining	2,509
Gladieux Oil	116
Great Western	244
Howell Refining	479
Husky Oil	616
Ida Gasoline	41
Illinois Farm Supply	524
Indiana Farm Bureau	1,370
Ingram Oil & Refinery	2,520
Jarvis Co.	119
Jet Fuel Refinery	43
Kerr-McGee	4,149
Laketon Asphalt	361
Leonard Refineries	2,650
Lunday-Thagard Oil	398
Macmillan Petroleum	3,203
Mid-America Refining	258
Murphy Corp.	3,096
Naph-Sol Refining	805
National Cooperative	3,067
Newhall Refining	1,165
Northwestern Refining	8,280
Ohio Oil	8,650
Oriental Refining	399
Osceola Refining	176
Oxnard Oil & Refining	274
Palomar Oil & Refining	388
Pennsylvania Refining	128
Petroleum Refining	234
Phillips Petroleum	16,320
Plymouth Oil	2,880
Pure Oil	13,067
R.J. Oil & Refining	394
Radio Refining	53
Rock Island Refining	1,748
Shamrock Oil	2,433
Sioux Oil	556
Skelly Oil	4,821
Socal Oil & Refining	966
Sonneborn Sons	176
Southland	2,283
South Penn Oil	1,137
Standard (Ohio)	11,404
Tennessee Gas	3,630
Texas City Refining	2,995
Texas Eastern	1,807
Texas Gas	805
Texstar Corp.	201
Three Rivers Refinery	104
United Refining	2,160
Vickers Petroleum	1,535
Waskom Natural	185
Westland Oil	198
Wickett Refining	218
Wolf's Head Oil	211
Wyandotte Chemicals	268

Venezuela crudes rank well out in front as the most traded foreign oils, with Kuwait crudes in second place.

Venezuela crudes figured in 49 of the direct swaps made so far, and was listed as an alternate foreign oil to be traded in another dozen transactions.

The Venezuelan government this week complained to the Kennedy Administration about such swaps by inland refiners (page 24). Kuwait oil was involved in 31 trades, and was listed as an alternate in several others. Sumatra and Neutral Zone crudes tied for third place in the number of transactions listed.

In the U.S., South Louisiana crude and condensate topped the list in swaps for foreign oil.

35% of Crude Allocations

The Most Active Quota Takers

Nearly all of the 319,234 b/d of import quota trades made so far for the January-June allocation period were acquired by 16 companies. For most of them, the trades mean that the quota-receiving companies will have considerably more foreign oil to run than was available to them under their assigned allocations. Three of the traders swapped off their entire quotas, and then acquired imported oil from other firms holding quotas.

Company	Crude & Unfinished Quota, Jan.-June	Additional Imports Acquired by Trades	Import Quota Swapped Off	Net Foreign Oil Available
		(Barrels Daily)		
Gulf Oil	79,777	33,025	2,751	110,051
Standard (Calif.)	75,459	43,935	8,789	110,605
Socony Mobil	57,255	46,600	3,000	100,835
Texaco	48,293	12,614	.....	60,907
Tidewater	44,632	47,044	.....	91,676
Standard (N.J.)	44,208	36,194	.....	80,402
Sinclair	38,160	10,660	.....	48,820
Atlantic Refining	36,144	23,571	1,304	58,311
Standard (Ind.)	31,606	13,027	.....	44,633
Sun Oil	30,960	4,857	2,735	33,082
Richfield (L.A.)	22,886	15,937	4,972	33,851
Signal Oil	16,790	4,710	14,616	6,884
Phillips Petroleum	16,320	2,538	16,320	2,538
Sunray Mid-Cont.	12,002	10,967	8,987	13,982
Ashland Oil	11,967	3,965	11,967	3,965
Standard (Ohio)	11,404	2,650	11,404	2,650

South Louisiana crudes of various types, and condensate from that area, figured in 12 transactions where the domestic oil was specified.

West Texas crudes—intermediate and sour—were exchanged in nine transactions.

Some idea of the values assigned to crudes involved in the swaps can be indicated from the transactions for Kuwait crude, the most widely traded of a single type.

That crude, with a posted price of $1.59, f.o.b. Mina-al-Ahmadi for 31-gravity, was traded for domestic oil, ranging from North Dakota to Texas Gulf Coast crudes, and from Pennsylvania-grade oils to Rocky Mountain sour.

Texas Hearings Show Cleavages In Gas Pricing

The first round of hearings in Midland, Tex., made it crystal clear that there are many chasms to be bridged before the Federal Power Commission's area pricing policy on gas can win acceptance.

There was, understandably, some confusion on both the objectives and procedures of the Midland meeting as it got under way Monday. The 400-seat movie house, in which it was held, was filled with participants and observers.

From the outset, FPC officials pleaded for cooperation.

FPC Chairman Jerome P. Kuykendall, who attended the opening session with Commissioner Arthur Kline, termed the preliminary hearing "a noble experiment."

He urged producers to "cease raising technicalities, just for the sake of raising them."

Kuykendall said bluntly: "We are starting today on what is possibly the last, best hope for a fair, workable regulation of a natural resource."

Chief Hearing Examiner Edward B. Marsh also stressed the need for cooperation, saying that "success or failure of the conference depends upon it."

Perhaps the most serious cleavage is the manner of group participation in a rate-setting—a prime objective of FPC in proposing area pricing.

John C. Mason, FPC general counsel, emphasized that the proceedings should "encompass the operations of all producers in a specified producing area."

But producers were unanimous in insisting that a way be left open for individual presentations in specific rate cases.

It was evident that some groups could agree on a common front—but no producer would agree to be bound completely.

So serious is this particular divergence that it could cause the overall pricing approach to fail unless some compromise is reached.

One FPC staff member said privately:

"It appears to me that the friends of this [area] approach may well kill it by insisting that everybody has a right to say everything he wants to say about every issue.

"The basic reason for this kind of

approach is to avoid individual cases for individual companies. If the hearing doesn't serve that purpose, then we're wasting our time."

Other important differences included the cost data questionnaire prepared by the FPC staff—but it appeared that a compromise might be possible here. The forms were denounced vigorously by producers large and small as being "unworkable" and far too expensive to fill out.

Stan Porter, of the accounting firm of Arthur Young & Co., noted that he had been working with 50 or more gas producers on an alternative form, and said the FPC version, based on individual company estimates, requires thousands of manhours to complete.

On the other hand, representatives from consuming areas generally favored the questionnaire.

After much discussion FPC Counsel Mason said the staff would be willing to work with individuals or groups in devising a form that would be mutually acceptable.

Many producers lined up with Humble Oil & Refining Co., whose spokesman said "no producer would accept any level as a permanent ceiling."

William J. Merrill, Humble attorney, stressed this and other views on behalf of his firm and nine other producers: Pure Oil Co., Sinclair Oil & Gas Co., Continental Oil Co., Standard Oil Co. of Texas, Skelly Oil Co., Phillips Petroleum Co., Sohio Petroleum Co., Cities Service Petroleum Co., and Pan American Petroleum Corp.

Many other producers concurred.

Merrill said the group is prepared to demonstrate that current contract prices for Permian Basin gas were "just and reasonable." He went on:

"If the commission arrives at area rates which approach the current replacement cost of gas, at least 90% of the producers will accept such a level as the beginning point for future regulation.

"Certainly, however, no producer will accept any level as a permanent ceiling. He would except, at reasonable intervals, to show that the price levels should be adjusted because of economic changes."

Humble discounted the workability of compiling area-by-area economic or cost data, favoring instead industrywide or companywide data.

Industrywide and companywide data, he said, "might be translated into area rates . . . and for the time being we think that this translation could be accomplished by considering the rates as the current market price in such areas."

"We do not here and now embrace area pricing as the proper method of regulating producer rates," Merrill said flatly. "We cannot possibly approve or disapprove until we know more in detail how the commission intends to apply it."

Consuming area viewpoints—from the Upper Midwest and California—defined anew the gulf separating them from the producers' position.

William E. Torkelson, general counsel for the Wisconsin Public Utilities Commission, called the area approach a "one-way street."

J. Calvin Simpson, counsel for the California Public Utilities Commission, said "cost of service" is essential as the basis for field prices.

George C. Mastor, representing a group of distributors, utilities, and cities in Minnesota, Iowa, Nebraska, and South Dakota, said there have been eight price increases since 1950, and added, "We will vigorously oppose any [further] increases proposed."

Business Capital Spending to Dip 3%

Business spending on new plant and equipment will sag to an estimated $34.6-billion this year. That's 3% under 1960, but not so low as many economists had anticipated.

The estimates made by the Dept. of Commerce and the Securities Exchange Commission are closely in line with those made by McGraw-Hill economists last fall.

A mild spurt in business spending during the second half of the year can be expected to put a floor under declining expenditures, the Commerce and S.E.C. officials reported.

Manufacturing companies will be the heaviest spenders—$14.1-billion. Durables will be off 7%, while expenditures in nondurables will increase 2%.

Petroleum, chemical, and food processing firms will take the lead in the nondurables.

Outlays in the petroleum and coal products category are estimated at $2.8-billion in 1961, compared with $2.64-billion a year ago. However, these figures represent only the processing end of the petroleum business.

For the oil industry as a whole, McGraw-Hill estimated that expenditures for drilling and new plants and equipment in the petroleum industry will peak at $6.7-billion this year, or 5.6% higher than the previous record set in 1960. A detailed analysis of current spending plans for 1961 will be made by McGraw-Hill in April.

In the durable goods category, only motor vehicle companies are planning to increase their spending—by some 15% to $1-billion in 1961, the survey shows.

Public utilities make up the only other major group with higher expenditures on the book.

They will spend an estimated $6.2-billion, an increase of 10% over 1960. Gas company expenditures are expected to be slightly higher than those of electric firms.

Railroads anticipate by far the sharpest cut in expenditures—42% under 1960 levels.

Spending for capital goods by the nation's railroads will fall from slightly over $1-billion in 1960 to an estimated $600-million this year.

Trade firms and nonrail transportation are also expected to show substantial declines.

NEXT WEEK *Be Sure to Read:*

PLANNED RESEARCH is a must . . .

There are always more ideas available to exploit by research than there are funds available. That's why systematic planning of research projects has become necessary in the industry in order to allocate research dollars wisely.

Gas Price Hikes Curbed

The Federal Power Commission underscored its intent to put a lid on producer gas prices when it ruled last week that "indefinite" price-increase clauses in gas contracts are illegal.

The move has been contemplated for years, but it came as a shock to producers on the eve of the Midland conference. FPC's first stab at developing the substance of its area-pricing proposal (page 17).

A producer consultant's reaction was: "The commission is using every device it can to keep gas prices down until it can find the lowest price in each area that will attract money for exploration and development."

This intent of FPC was pointed up by the fact that the ruling came in a case involving the Permian Basin, the area being considered in the Midland conference.

A rate increase case that the commission singled out in 1959 as a test of the legality of indefinite pricing clauses was the vehicle for the move.

The increases were by Pure Oil Co. for sales to El Paso Natural Gas Co. in the Permian Basin.

El Paso has renegotiated its Permian Basin contracts to strike out many of the indefinite pricing features. In exchange, it offered producers increases over the 11¢-per-Mcf. ceiling for "old" gas that FPC has since set for the area.

The ruling will apply only to contracts filed after Apr. 3. But it dramatizes the commission's distaste for indefinite pricing features.

The commission discussed these clauses in the Pure Oil case, and concluded it didn't have a right to declare them illegal retroactively.

It then denied Pure Oil the increases on the ground that the indefinite pricing clauses in its contracts hadn't been triggered, and issued a separate order changing the commission rules to outlaw "indefinite" clauses.

These are the types of provisions the commission declared illegal:

- Redetermination clauses, calling for periodic increases to an average of the highest prices being paid in a producing region.
- Renegotiation clauses, allowing arbitration between producer and purchaser at regular intervals.
- Two-party favored-nation clauses, under which the producer is entitled to an increase if his purchaser pays a higher price to another producer.
- Three-party favored-nation clauses, under which the producer gets a higher price if any other producer in the region sells for more to any other buyer.

FPC said it will allow definite escalation clauses, calling for specific increases at set intervals. It will also allow clauses hiking prices to compensate for increases in production, severance, or gathering taxes.

In order to change its rules, the commission relied on notice it gave in the spring of 1956 that it was considering banning "indefinite escalations."

Discussing indefinite escalations generally, the commission said:

"Such an artificial ground for a proposed increase, operating in such a mechanical and arbitrary manner, and lacking any substantial relationship to the factors which bear on the value of gas . . . does not constitute a proper basis for filing proposed increased rates," at least if they exceed area prices.

Commissioner Arthur Kline agreed with most of the commission's ruling, but he thought it went too far in barring renegotiation of prices after five years.

A producer "should not be compelled to agree at the beginning of his contract to a fixed price for the gas 20 or 50 years in the future, when conditions may be wholly different," Kline said.

This seemed especially true to producer spokesmen in light of the U.S. Supreme Court's decision last June saying, in effect, that gas sales in interstate commerce are for the life of the reserves.

One industry man speculated that the Supreme Court's decision, together with FPC's new ruling, would make a gas contract practically meaningless.

editorial index

The index to the editorial contents of Petroleum Week, covering the issues published from July through December, 1960, is now ready for distribution. Single copies are available to subscribers without charge. Readers who have previously asked to be placed on the permanent mailing list will receive the index automatically. Others may address requests to Editor, Petroleum Week, 330 West 42nd Street, New York 36, N. Y.

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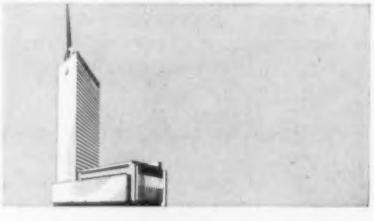

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Engineers Are Broadening Their Scope

More and more, operating personnel in refineries and chemical plants are having to concern themselves with problems other than engineering.

Not so many years back, meetings of technical societies of professional engineers consisted essentially of reports on new or improved processes, better or less costly equipment, and more satisfactory construction materials.

It's a sign of our times that much more abstract questions occupy their minds today.

Of the 26 technical sessions that were a part of the 44th annual meeting of the American Institute of Chemical Engineers in New Orleans last week, ten were devoted to such matters as the mathematical approach to new business ventures, the geographical trends of the petrochemical business in the U.S. and abroad, and the changing role of the chemical engineer.

One of the reasons that engineers are taking a broader view is that refineries and chemical plants are becoming increasingly alike.

Even the most hair-splitting analyst would have found it difficult to decide what parts of the AIChE program were specifically addressed to the oil men or to the chemists in the well-blended audience.

The part played by the petroleum industry in the development of the organic chemicals industry is growing rapidly in the U.S. and abroad.

Thus, it will be difficult from now on—if not impossible—to differentiate between the two industries: Any development that affects one will have its repercussion on the other.

PETROLEUM COMMENTS / By Wanda M. Jablonski

The Profit You Lose May Be Your Own

Unless the domestic oil industry is careful, it may come up with a profitable year in 1961.

After nearly four happy years of wallowing in oversupplies and sagging prices, this could be an unaccustomed and uncomfortable prospect.

Already, domestic oil prices have recovered to a sounder level than they have seen since 1957.

The industry, of course, is not to be blamed for this. It was caused largely by factors beyond its control: the unusually cold winter, plus the firm action of the Texas Railroad Commission in holding down supplies.

But now that spring is just around the corner, the industry is again master of its own fate, captain of its own ship.

If the industry will now follow faithfully its well-known, well-tried, and thoroughly proven methods of operations, it can assure itself that it will wind up the year 1961 with no long-lasting break in its four-year record.

* * * *

There are many courses open to an alert management.

For instance, it can maintain refinery runs during the second quarter of the year. This approach has many advantages: It is simple; it requires no real effort; and it is foolproof.

Domestic demand in the second quarter of the year usually runs some 1.5-million b/d lower than in the first quarter. Obviously, if refinery runs are not reduced sharply, several birds can be killed with the same barrel: Last year's supply-demand imbalance can be restored again, and lower prices can again be reinstituted (and President Kennedy made happy, too). If the course is pursued with reasonable tenacity for just a couple of months, the industry can be safely assured that by the end of June its price structure will have become so thoroughly demoralized that nothing can be done over the remainder of the year to disturb the situation.

* * * *

Failing this, one can always invoke the theory of the "incremental barrel." By refining more than he needs, the refiner can reduce his "unit costs." So he can afford to cut prices to move that extra, unneeded product.

This incremental barrel theory is one of the best-established, proven industry practices for bringing the entire price structure down.

Then there's another effective course: Instruct your marketing departments to start up aggressive campaigns calling for a 10% increase in sales when the demand increase is perhaps 2%.

This approach carries an extra dividend: Not only will it ensure price wars, but it will also give your company a fine "sales record" to impress your remaining stockholders.

* * * *

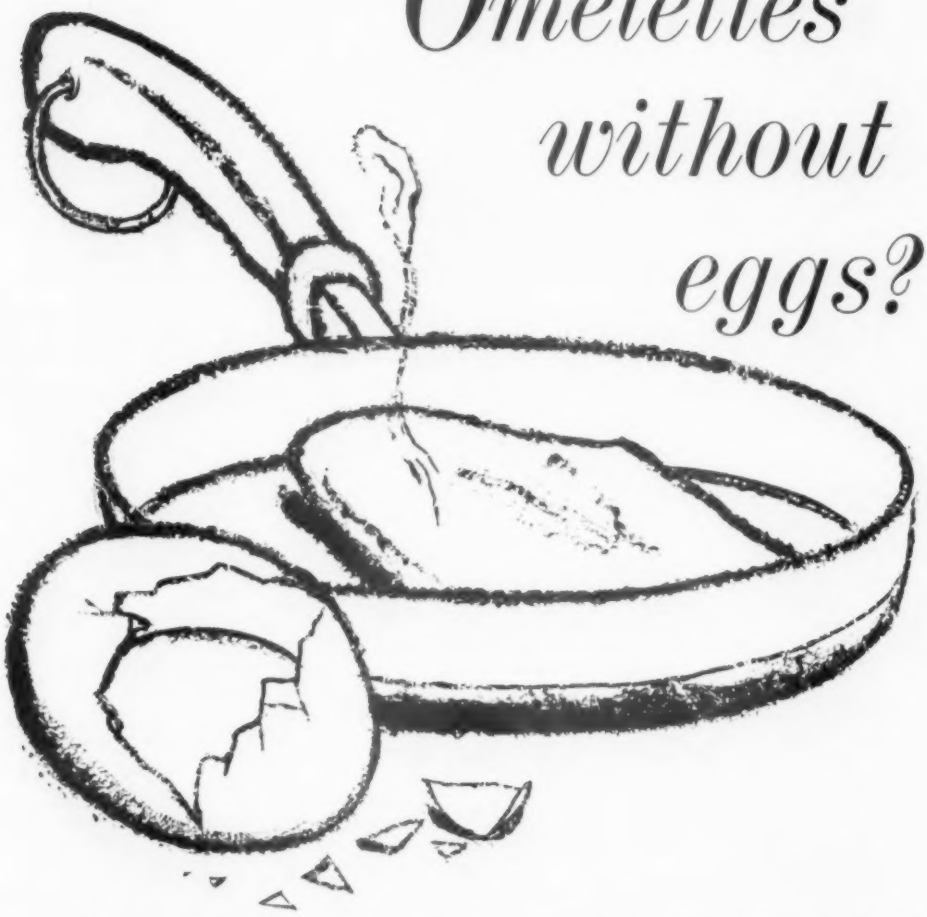
The approaches cited above are only offered as a few helpful hints. They by no means exhaust the possibilities open to an industry with as much surplus experience as this one.

But remember one thing: Don't leave the job to the other fellow. You, too, must do your part: The profit you lose may be your own.

Number 2 of a Series

TELL THIS PETROLEUM INDUSTRY FACT TO YOUR NEIGHBOR

Omelettes without eggs?



Omelettes without eggs? You might as well ask for natural gas without oil . . . for the fuel that burns in thirty million American gas ranges is produced by the *oil and gas industry*. Natural gas was once like experience: you found it only when you were looking for something else. Today, in some communities, the household demand for natural gas is greater than available distribution . . . even though industry capacity has been doubled in the past ten years to supply consumer and industrial demand for this modern fuel.

A healthy national economy requires that the petroleum industry locate new gas reserves, drill more gas wells and build more pipelines. Percentage depletion assures the petroleum industry of the "seed corn" that guarantees the future gas and oil needed to meet the ever increasing demands of America's homes and industries.

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Prize Winning Symphonies in Steel

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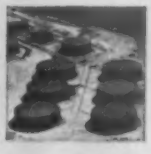

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What's New IN THE INDUSTRY

John E. Swearingen, president of Standard Oil Co. (Ind.), will represent the oil industry at House hearings next Tuesday on President Kennedy's pay-as-you-go highway plan. Specifically, the industry is opposed to Kennedy's proposal to retain the fourth cent of the federal gasoline tax, which is due to expire June 30.

•

A constitutional amendment to bar diversion of gasoline taxes to nonhighway uses will be on the Utah ballot in 1962.

The resolution embodying the amendment cleared the House last week; it had previously passed the Senate. Approval by the Governor is not required. The measure is supported generally by bus, truck, and oil company interests, and opposed only by a few members of the legislature who believe such earmarking of funds severely restricts the use of state revenues.

•

Texaco Inc. was high bidder, with $9,550,000, for parcel 2, a 4,250-acre offshore tract off Santa Barbara County, Calif. It was the second offshore lease to be offered by California since an award of five offshore parcels in July, 1958. Parcel 1, offered on Feb. 3, 1961, failed to draw a single bid.

Two other bids were received for parcel 2: a $1,600,015 bid by Richfield Oil Corp. (L.A) and a bid of $851,600 by a group composed of Phillips Petroleum Co., Pauley Petroleum, Inc., Kerr-McKee Oil Industries, Inc., Austral Oil Exploration Co., Inc., Union Texas Natural Gas Corp., Joseph E. Seagram & Sons, Inc., and Caulkins Oil Co.

•

American Oil Co.'s present contract with OCAW Local 4-449 at Texas City will remain in effect for another year. This means it will be extended until June 30, 1962. Provisions of the company's severance allowance plan has also been extended until that date.

Meanwhile, another OCAW local, 4-433, reported that its members have overwhelmingly approved a new contract with Humble Oil & Refining Co. at its Baytown refinery. The new pact extends through Mar. 9, 1962.

•

Functions of the General Mid-Continent Oil & Gas Assn. and its Kansas-Oklahoma division are being separated.

The two have been jointly operated out of the Tulsa office by the same personnel for the past 35 years. The division is the only unit that has continued to function in conjunction with the national association since the latter was divided into regional groups several years ago. Industry sources say it could be the first step toward moving the association's headquarters to Washington.

•

Continental Oil Co. plans to spend some $6-million to drill 64 exploratory and development holes in Texas this year. The company intends to invest another $4-million primarily in production equipment, service stations, and natural gas facilities.

•

Tennessee Gas Transmission Co. is out to allay fears of Mexican gas users that the Texas-to-California pipeline will hurt their future gas supplies. William W. Witmer, senior vice-president of the company and head of the Texas-Mexico-California gas project for TGT, said in Mexico City that TGT would advance the Mexican oil monopoly, Pemex, $15-million to build a Poza Rica-to-Tampico gas line.

•

Contracts between Ohio Oil Co. and Dow Chemical Co. will bring the first production of benzene from toluene to the Midwest. Benzene has been produced using the conventional dehydrogenation of cyclohexane method for several years in the Midwest by Leonard Refineries, at Midland, Mich., American Oil Co., at Whiting, Ind., and Shell Oil Co., at Wood River, Ill.

Ohio Oil Co.'s Aurora Gasoline Co. is expanding its Detroit refinery to supply Dow Chemical Co. with about 20-million gal. a year of a benzene-toluene mixture for conversion to pure benzene (PW—Feb.24'61,p37).

•

The National Petroleum Council is creating a committee to study U.S. petroleum and gas transportation capacity as of Jan. 1, 1961. Monroe E. Spaght, president of Shell Oil Co., will be chairman of the committee.

•

Richard C. Byrd has been named to the Kansas Corporation Commission, and is expected to become the agency's chairman. He replaces J. Robert Wilson, whose interim term expires Mar. 20. Byrd is a former commissioner, and served nearly five years until last November, when he was replaced by Alvin Grauerholz.

Looking Ahead in Washington

McGraw-Hill
Washington Bureau

March 10, 1961

Venezuela has moved quickly with the Kennedy Administration to press its objections to the oil import program. The change in officials, the heightened awareness in Washington of Latin American problems, and the Interior Dept.'s review of residual fuel oil controls are all factors making Venezuela's current efforts timely.

The Betancourt Government has sent a strongly worded aide-mémoire to the State and Interior Depts. The message protests controls on residual fuel as harmful to Venezuela, and of no benefit to the U.S. oil industry; it cites the availability of Venezuelan oil in the U.S. during past emergencies; it warns that any cut in oil income would seriously endanger the stability of the democratic Betancourt Government.

Venezuela is fighting crude quotas for inland refineries economically unable to use imported oil. By trading their quotas with coastal refineries (page 16), Venezuela argues, inland firms reap windfall profits that come from the pockets of the producing countries, where discounted prices are necessary to hold U.S. markets.

The Kennedy Administration will consider such claims seriously. President Kennedy has repeatedly shown his concern over Latin America, and has A. A. Berle, Jr., former Assistant Secretary of State, heading a task force on Latin America. For more clues to Kennedy's attitude toward Latin America, watch for his message to Congress, scheduled for Monday.

•

Venezuela figures in U.S. Government approval of Canada's new oil export drive. U.S. officials are urging international companies operating in Canada to support the Canadian plan to boost exports to the Pacific Northwest and Upper Midwest. Also, Oil Import Administrator Lawrence J. O'Connor deems the proposed expansion reasonable.

•

Oil companies that bought tankers from the U.S. during World War II may be in line for some tax refunds. Two such companies, Socony Mobil Oil Co. and Texaco Inc., have won a unanimous Court of Claims decision in a test case with the Internal Revenue Service over how to fix the cost of the ships for depreciation purposes.

Ships sold after the war under the Merchant Ship Sales Act of 1946 went for less than companies paid during the war. Therefore, refunds were given to companies that had already bought ships, but the refunds were less than the difference between the prices paid and the going prices in 1946. Internal Revenue wanted depreciation to be based on the lower 1946 price, rather than on the higher figure of cost less refund. The court termed this "artificial."

•

Funds for the Interior Dept.'s new helium conservation program will be delayed. Interior Secretary Stewart L. Udall backed former President Eisenhower's bid for $12-million immediately to get the program started, but the House Appropriations Committee wanted more time to study the program.

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The versatile R-3 Treating Packer by Halliburton is actually several tools in one. It can be used in a cased well to isolate a zone for treating, fracturing, water flooding, or it can be applied as a production packer. Here's how this versatility performs . . .

IN THIS POSITION, the full-opening R-3 Packer is an excellent *tension-set*, self-anchoring wall packer. It is designed to seal against differential pressures up to 5,000 psi from below. In this application, right-hand rotation and upward pull on the tubing sets the slips and expands the packer rubber to provide a seal.

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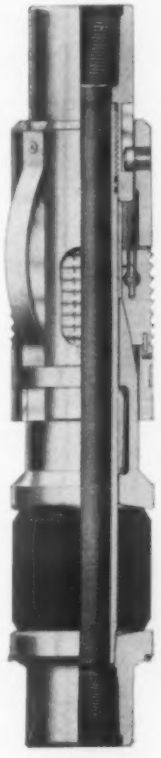

◀ . . . . . and the R-3 becomes a *compression-set* packer, ideal for use in deeper wells where tubing weight is sufficient to set packer rubbers. The R-3 is usually run in this position for holding pressure from above where hydrostatic pressure in the annulus exceeds pressure below the packer.

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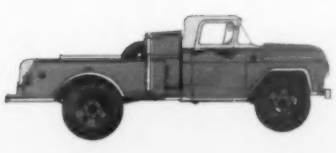

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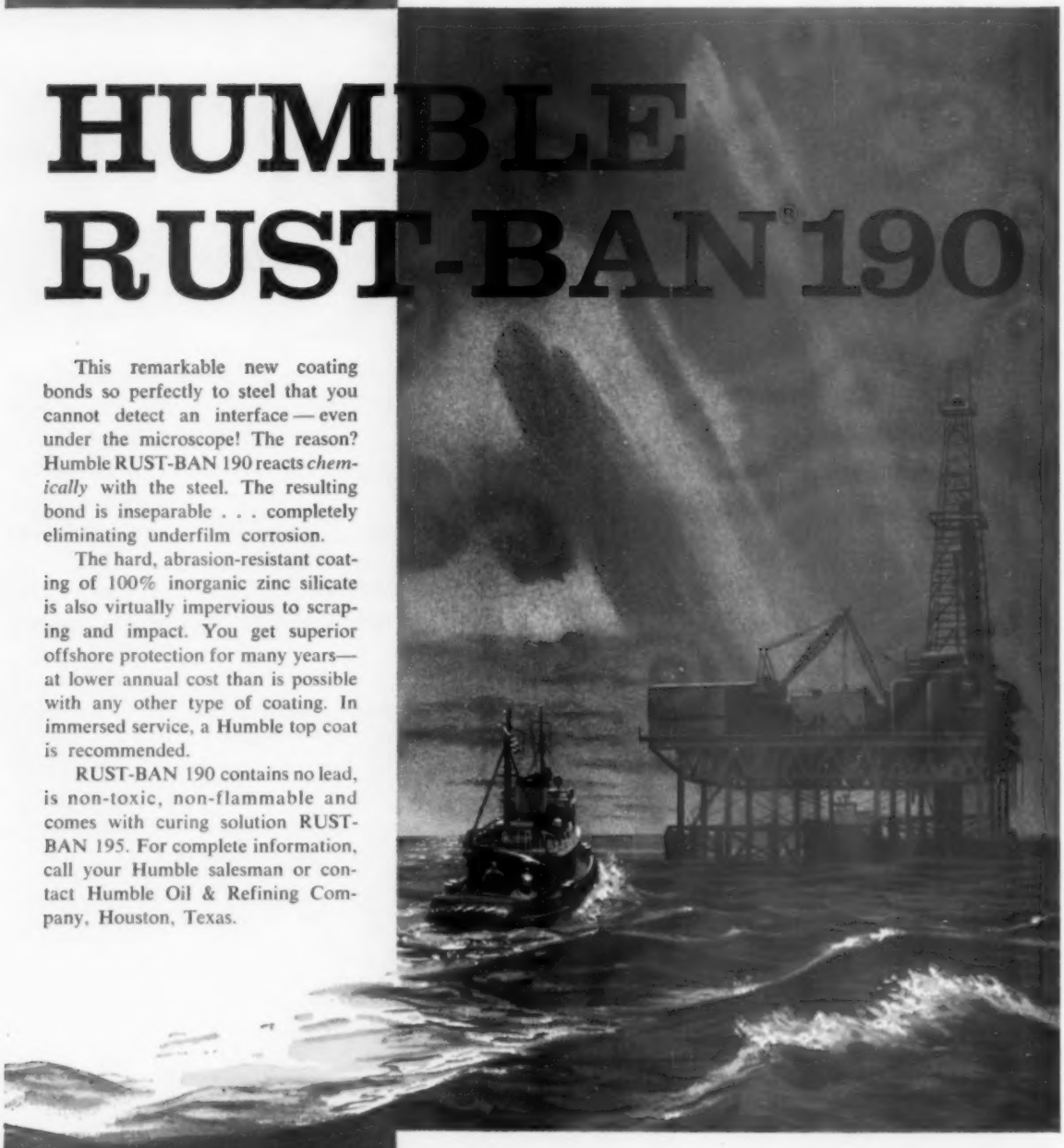

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Sinclair Tests Economy of Fireflood

A pioneering effort to determine the economic feasibility of tertiary oil recovery from a watered-out reservoir via in-situ combustion has been started by Sinclair Oil & Gas Co.

The project is being undertaken jointly with Sinclair Research, Inc., on Sinclair's 3,074-acre, fee-owned and company-operated tract in the Delaware-Childers pool, Nowata County, Okla. The total areal extent of the Delaware-Childers pool is approximately 6,900 acres.

Of the program's purpose, a company spokesman says, "We are now relatively well versed on the mechanics of in-situ combustion. What now remains is to prove the economic feasibility of having such a program follow the waterflooding process."

The Delaware-Childers project is predicated upon experience derived from earlier experiments.

The research company's initial fireflood project was begun in 1948 in another portion of the pool. It was discontinued in 1955, partly because secondary recovery waterflood activities had caused an approaching flood front.

A second experimental project, completed several months ago near Humboldt, Kan., was somewhat more extensive than the first Delaware-Childers test.

Much of the Humboldt equipment is being used on the new Delaware-Childers project.

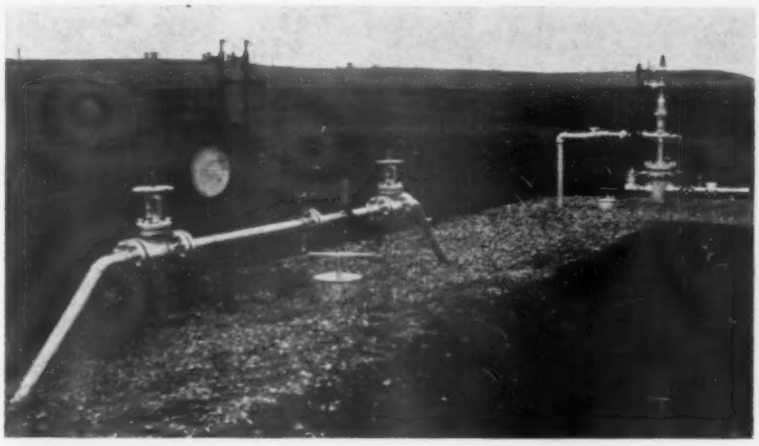
Sinclair began the experiment's first phase, ignition in the sand underlying a 2.2-acre pilot tract, late last year.

Sinclair first injected air for two weeks to improve the reservoir's permeability. This work had the side effects of increasing reservoir pressure from 450 psi. to 650 psi., and of giving a slight production "kick" to surrounding wells.

Following the initial air-injection phase, a mixture of gas and air was briefly injected down both the tubing and the annular space, and the mixture ignited at the pay face.

A simple downhole air-gas heater, run on tubing, was initially used to ignite the mixture. When ignition occurred, the heater was removed from the hole and compressed air injection was begun.

Air required to support combustion is currently being injected at a rate of 830,000 cu. ft. per day. All the oxygen entrained in the air stream is consumed during combustion. The air is compressed to 750 psi. and injected into the reservoir at a temperature of around 150F.



INJECTION WELLHEAD, in background, has been used for both gas and compressed air. Circular chart, in foreground, records injection volume; for air, 830,000 cf/d.

Sinclair is forcing the air downhole with a Clark model HMA-8, two-cycle, four-stage compressor powered by an eight-cylinder gas engine. The compressor uses an atmospheric heat exchanger to cool the air between the third and fourth compression stages.

The pilot operation includes four "corner" producing wells, spotted 220 ft. apart around a central air injection well.

Two of the four producing wells are converted water-input wells, formerly used during the pool's secondary recovery phase. The other two wells had been producers during that phase. The air injection well was drilled specifically for the fireflood experiment.

The injection well was drilled with rotary tools through the pay section, and completed with 5½-in casing set 10 ft. into the sand. No surface pipe was run, but casing was cemented to surface.

Two-inch tubing is suspended inside the casing to conduct the air. Sinclair has found that combustion can be maintained for several days without air injection.

Because of the large amount of Delaware-Childers oil yet to be recovered, Sinclair believes its portion of the pool is a nearly ideal location for the tertiary in-situ combustion experiment.

The reservoir is a lenticular, bar-type sand deposit. Primary production was obtained by solution gas drive, and very little water was produced during early stages of the pool's development. Water for secondary-recovery phase flooding was drawn from the nearby Verdigris River.

Production is from the Bartlesville (known locally as the Childers) Sand, encountered at an average depth of 650 ft. throughout the area. Average net pay thickness is 30 ft, average porosity 22%, and average permeability 100 millidarcys.

Produced oil is 35-gravity with a viscosity of approximately eight centipoise at 100F.

Of the estimated 85.5-million bbl. of oil originally in place in the reservoir, some 49-million bbl.—better than 50%—still remains, despite the pool's subjection to a series of primary and secondary recovery techniques.

Primary production, following rapid pool development during 1906-07, resulted in the recovery of 153 bbl. oil per acre/foot of pay. Early methods of artificial lift included the use of vacuum which was induced to the wellheads.

The primary recovery period was followed by several years of air and gas repressuring. This program recovered an additional 142 bbl. of oil per acre/foot.

Waterflooding, started ten years ago, has led to recovery of some 130 bbl. of oil per acre/foot. But this method is rapidly approaching its eco-

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nomic limits as a means of reservoir depletion.

Sinclair expects that one year will be required to evaluate the fireflood operation's economic potential. But so far, work has gone smoothly.

As a company spokesman says, "About all we've proved so far is that combustion can be instigated and maintained in a largely watered-out reservoir with a minimum of equipment and expense. We have encountered no mechanical difficulties whatsoever."

With the exception of the small production increase that followed the initial, air-injection phase, no "kick" has yet been obtained. Sinclair estimates from the amount of air required to support combustion that the heat-wave periphery has by now extended outward from the injection wellbore around 50 ft.

Deep Disposal Hole to Be Started

Work is slated to start soon on what is believed to be the deepest waste disposal hole ever drilled. It's for the Army at the Rocky Mountain Arsenal, near Denver.

Loffland Bros. Co. won the contract to drill the hole with a bid of $264,688. This compares with the government's estimate of $277,623. The Tulsa company was one of three bidders (PW—Dec.30'60,p36). The bids were on a day work basis.

The 11,400-ft. hole is also expected to shed some light on the deep geologic makeup of the Denver-Julesberg Basin. The basement test will be the deepest ever drilled in the basin by approximately 2,500 ft.

The well is being designed for a maximum 2,000 psi. injection pressure at the surface. Safeguards against waste leakage are also being incorporated.

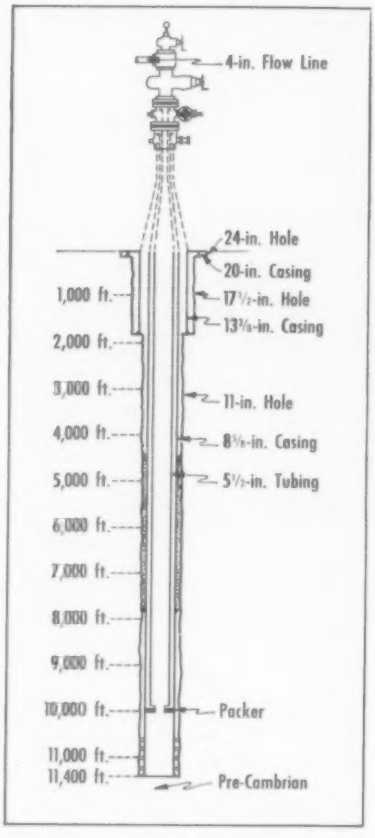
The hole will be 24-in. in diameter at the surface and 11-in. at its total depth. The initial 125 ft. will be a 24-in. hole cased with 20-in. pipe. From 125 ft. to 2,000 ft. there will be a 17½-in. hole with 13⅜-in. casing. From 2,000 ft. to total depth, the hole will be 11-in. in diameter, with 8⅝-in. casing.

Injection will be through 5½-in. tubing. The tubing will run to 9,000 ft. with packer set at that depth. The injection tubing weighs 23 lb. per foot, and is reckoned to be corrosion resistant for a 50-year period. The annulus between the casing and tubing will be water-filled.

It's not known yet whether the well will be acidized or fractured.

The waste disposal problem dates back to the establishment of the Rocky Mountain Arsenal in the early days of World War II.

Initially, waste was disposed of by dumping it into a pond on the reservation. Complaints came from nearby farmers that crops were being damaged by contaminants in water they were getting from a subsurface stratum for use in irrigation. The initial complaints were followed by construction of an extensive waste-collecting system and a sealed-bottom waste disposal pond. But now that pond is nearing its capacity.

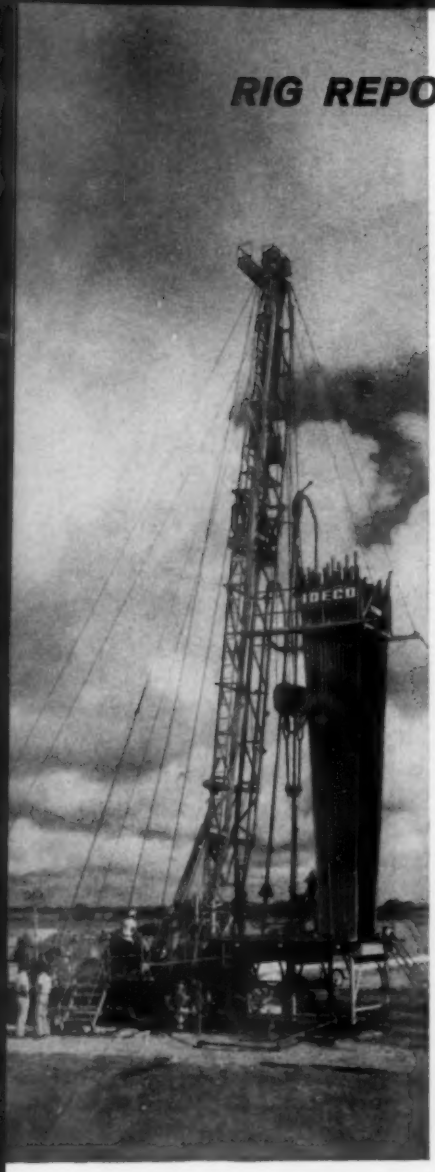


Disposal will be into the Fountain formation, a coarse to medium-grained sandstone 1,500 ft. thick.

The Fountain is well below the oil-bearing J sand in the area.

A companion waste effluent treating facility will be built by Newstrom-Davis & Co., Denver. The company's winning bid was $374,567. The government estimate was $380,126.

RIG REPORT



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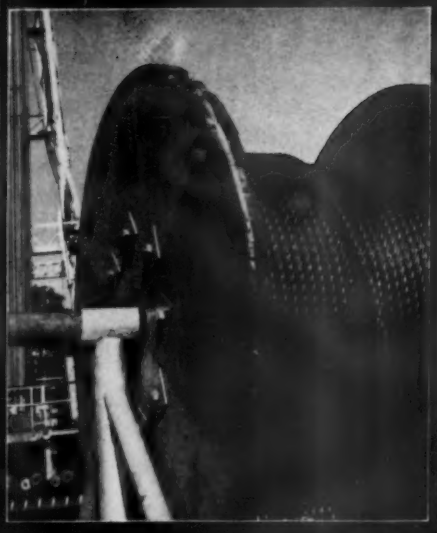

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121

How to Unstick Drillpipe

Costly, time-consuming differential-pressure sticking of drillpipe can be minimized by using new techniques in combination with older approaches.

Elard L. Haden and Glenn R. Welch, both of Continental Oil Co., note that use of such techniques is not a cure-all for the problem, which has plagued drillers since the advent of rotary drilling, particularly in high-pressure areas.

Haden and Welch told this week's meeting in Dallas of the Southern District, Division of Production, American Petroleum Institute, that laboratory studies show that there are other steps that can be taken, in addition to approaches previously suggested.

Proper mud type and composition and use of surface-active agents are among the factors that can reduce sticking.

The Conoco researchers found that gyp mud has an appreciably lower sticking tendency than other muds tested, particularly at high mud weights.

Data indicate that if an 80,000-lb. pull were necessary to free a drill string stuck in a 14-lb.-per-gal. gyp mud, 106,000-lb. pull would be required for calcium-surfactant or low-pH red mud, 112,000 lb. for a low-lime mud, and 144,000 lb. for a high-calcium mud.

The two added: "At the present time, we do not have a satisfactory explanation as to why the muds differ; but the results obtained indicate that sticking can be reduced by choice of muds and maintaining the solids concentration as low as possible."

In their study of surface-active agents, Haden and Welch directed efforts toward materials that could be added to the mud system to provide a constantly renewing film on the drill string, to reduce friction.

Use of three agents with 15-lb. gyp-base mud showed that all of them could reduce the amount of force needed to unstick the drillpipe, while one of the three was somewhat more effective in reducing the force required to keep the collar moving.

Another series of tests showed that the sticking tendency of mud can be made independent of the mud weight by addition of sufficient lubricating agent.

Use of such agents, compatible with most mud systems, was found effective with both gyp and calcium-surfactant muds. But while such lubricating agents greatly reduced sticking at high mud weights, they increased sticking at low weights.

Another way to reduce sticking is to decrease the drill collar-filter cake contact area.

The researchers found that the magnitude of the load, or force, holding a collar against the side of the wellbore is directly proportional to the area of the collar in contact.

Haden and Welch ran tests using a collar fitted with stand-off bands. The "breakaway" force for this collar was 60% less than conventional collars, and "pulling," or moving, force was 75% less.

But, they added, collars of this type would not be as effective in the field because irregularities in the wellbore would alter the collar-filter cake contact pattern.

Haden and Welch concluded that a combination of all these techniques will provide more protection against sticking than any single technique.

Further, they said, constant pipe movement and good muds are essential in areas where differential-pressure sticking occurs.

Several new techniques have been developed for using aluminum pellets to obtain high-conductivity fractures.

A three-man team from Atlantic Refining Co., T. K. Perkins, L. R. Kern, and R. E. Wyant, reported that a spearhead of leak-off control fluid simplifies the placement of a nearly uniform concentration of aluminum in the fracture. This fluid is injected first to create the desired fracture area.

It "leaks" into the formation, plasters the fracture walls with filter cake, and so limits further fluid leak-off. Therefore, the fluid that carries the aluminum particles can be injected later with very little leak-off.

The trio reported that the concentration of aluminum in the fracture will be essentially equal to the concentration injected into the well.

They added that the fracture made by a leak-off control spearhead may not be wide enough to accept aluminum pellets.

Studies show, however, that a crack wide enough to accept aluminum pellets can be created by injecting a viscous fluid into the fracture ahead of the pellets.

And for a sparse distribution of pellets, the particles must be suspended in a thick carrying fluid, regardless of fracture orientation, the researchers found.

The three said that sand often can be used in conjunction with aluminum to reduce costs and still achieve desired stimulation.

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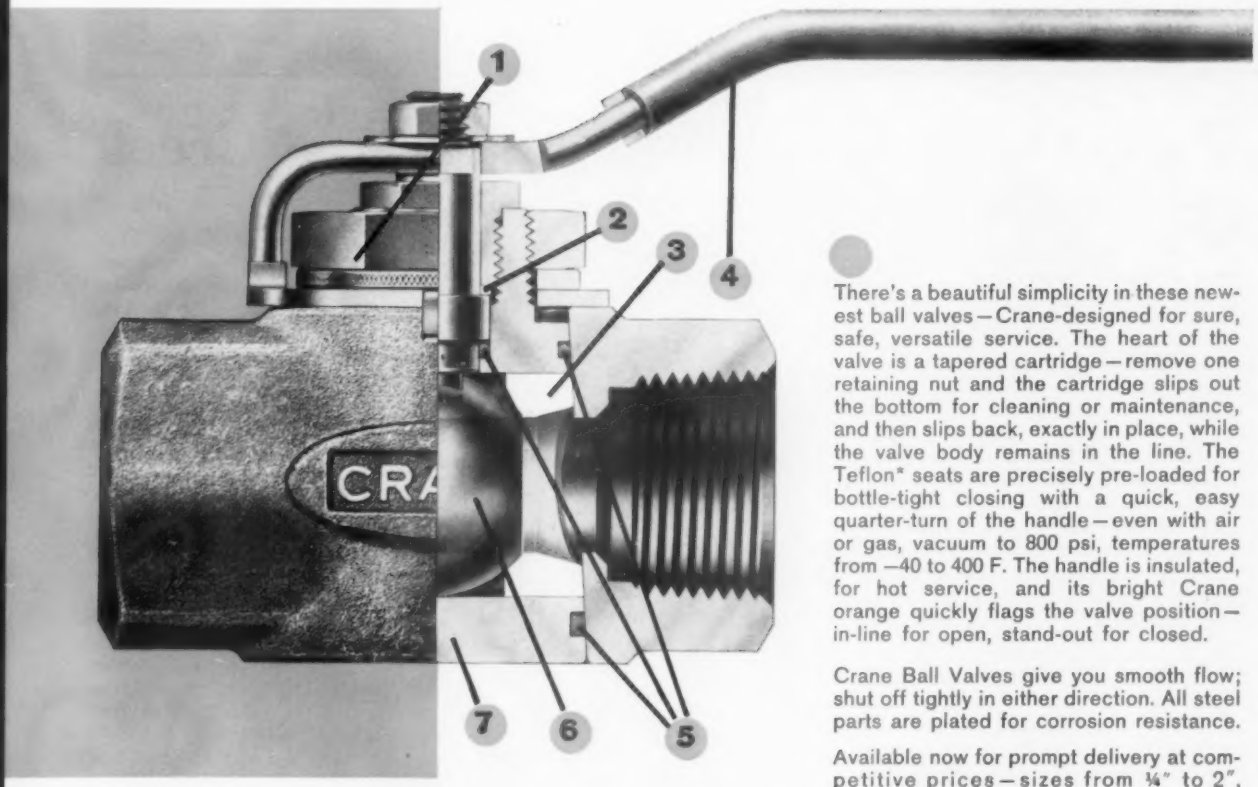

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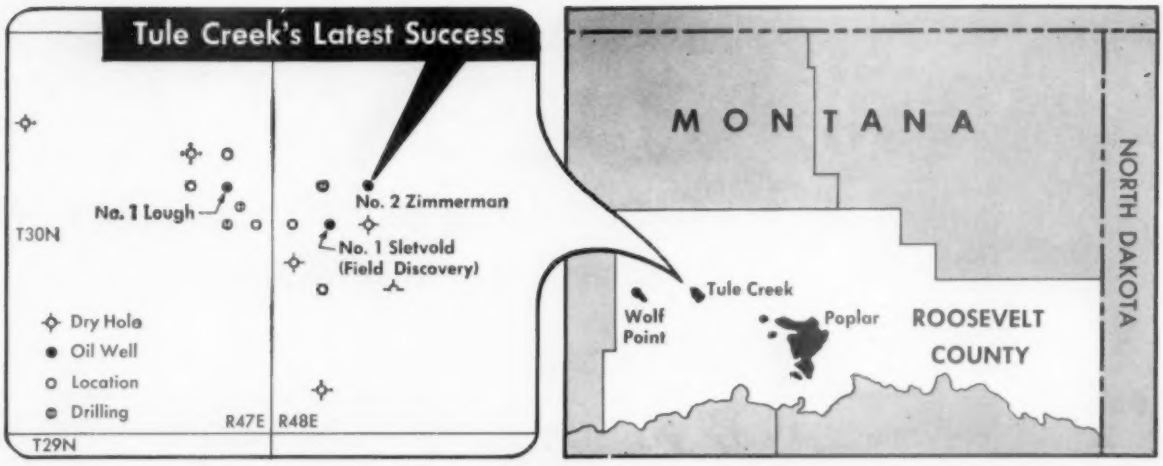

Pace Quickens at Montana's Tule Creek

News is breaking fast in Montana's bustling—but baffling—Tule Creek area, Roosevelt County, 15 mi. northwest of Poplar field.

The area burst into prominence with a discovery in late 1960. The amount of work that followed immediately made Tule Creek the most discussed Rocky Mountain success since Utah's Lisbon discovery in late 1959.

Few areas of deep production in the Rockies have seen so extensive a drilling program develop so quickly.

Results of drilling to date, however, have been mixed.

Early enthusiasm has not yet been completely justified—nor has it been fully dampened.

Early this February, operators started "loosening up" with some data, and it generally confirmed unofficial results already reported.

At last report, this is the Tule Creek breakdown: Two wells completed as producers; one prospect; nine dry holes; one test at total depth; five drilling above the Devonian; six locations; and three locations abandoned or suspended.

The statistical emphasis on failures is tempered by the fact that activity has been spread over no less than ten townships.

Humble Oil & Refining Co. has just filed a request for 160-acre spacing in the field.

The company also suggested field limits to the Montana Oil & Gas Conservation Commission, and requested that development on the 160-acre pattern allow the operator, at his option, to drill the required well in the approximate center of either the southeast or northwest quarter of each quarter-section spacing unit.

Hopes for the area have been shored up by two recent successes, both offsets to No. 1 Sletvold, the Tule Creek discovery.

Murphy Corp. and Humble No. 2 Sletvold, section 18-30n-43e, recovered 145 b/d of oil and 356 b/d of water on the pump through perforations at 7,684-88 ft. in the Nisku (Devonian). It is north of the discovery.

And Murphy Corp. No. 2 Zimmerman, section 17-30n-48e, flowed at the rate of 28 bbl. an hour on 2½-hour test of the Nisku at 7,670-705 ft. The company is now coring below 7,705 ft. in the test, which is northeast of the discovery.

The discovery, in section 18-30n-48e, was completed for 476 b/d of oil through 14/64-in. choke and perforations at 7,660-92 ft. from the Nisku. Early data released on the well, however, had indicated a possible pay section of 100 ft. or more.

There was no previous production from the Devonian in this area; the closest was 35 mi. away.

An 80-acre southeast offset to Placid Oil No. 1 Lough, the only other producer in the field, is now being tested.

No. 1 Lough, section 13-30n-47e, was completed for 600 b/d.

Humble and Phillips Petroleum Co. are testing the Nisku at No. 1 McKee, section 13-30n-47e, northwest of the discovery. Recovery on drillstem test at 7,618-32 ft. included 610 ft. of free oil.

Dry holes have partly defined the pool on its southeast and northwest edges.

Four dry holes have been drilled on the southeast, and one in the northwest. Other dry holes have been drilled farther from the discovery area. All failures went to the Devonian.

Because they anticipated competitive sealed bid sales on a considerable amount of open acreage in the area, operators kept most well information tight.

Even on the discovery, complete data was not released, although many of the details of cores and tests were disclosed.

Most of the open acreage in the region was under the control of the Ft. Peck Indian Agency, Poplar, Mont.

The first sale, on Jan. 17, involved some 40,000 acres. It got an enthusiastic response.

Bids were received on 149 of the 197 tracts offered. Some of the more remote tracts were ignored. Leases were granted on 32,405 acres. Bonus amounted to $1,319,082, for an average successful bonus bid of $40.58 per acre. Top bid was $350 an acre by Shell Oil Co., for a tract southwest of the discovery.

Enthusiasm for the second sale, on Feb. 14, was more tempered.

The land offered was generally south of that leased in January, more scattered, and a greater distance from production. These factors, plus the mixed results of drilling so far, had a bearing on the fact that only 45 of 180 tracts offered, received bids. This amounted to 10,135 acres, of a total offering of 41,170 acres.

High bidder at the sale was Humble, with $26.73 per acre for a tract 6 mi. south of the Tule creek discovery.

Total bonus bids amounted to $95,796, for an average of $9.45 an acre.

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Electricity Makes Viscous Crude Flow

A secondary recovery process that electrically heats very viscous oil is scoring well in experimental tests by Electrofrac Corp., Kansas City, Mo.

"The process is designed for use in old or abandoned fields that haven't been exhausted by known recovery techniques," says Erich Sarapuu, president, "or to reduce recovery costs where the process proves applicable.

"We are interested in very viscous oil that can't be produced under present recovery processes."

Electrofrac Corp. is doing the work under contract for Kewanee Oil Co., the process can later be licensed to other firms.

Experiments to date indicate the "Electrofrac" process will be a workable, economic method of extracting viscous crude, the company says.

Continued studies are needed before the process will be offered as a commercial package.

"The company is sure of the practicality of the process," he adds, "but we are gaining field experience at additional field stations it is designing.

"We are ready to design commercial-size equipment, and we're looking for diversified reservoir conditions where we can put it to work."

In a nutshell, the process works this way: Electrodes are dropped down the oil wells and electric current is passed through the oil sand between wells.

Combustion and oil sand electrification can be used simultaneously if reservoir conditions require it, thus causing the oil to flow.

The company is conducting its experiments at a field station, 3 mi. east of St. Paul, Kan., on its own lands. Production is from the Peru sand at 200 ft. and the Bartlesville at 400 ft. Power is supplied by a stationary substation with a 1,200-kw. capacity.

The company is working on a five-spot pattern. On the five-spot, the wells form a rectangle only 160 ft. by 200 ft. due to the existence of old wells in the area. Two wells are usually electrified at the same time.

Current is carried by cable or by tubing to the electrode at the well bore at 200 ft. Stainless steel electrodes—roughly 1-ft. long, and of more than 5-in. diameter and attached to the foot of the tubing—shoot the voltage across a gap of 200 ft. to the other electrode. Well casings are of 5½ in. to 7 in. diameter.

In the second stage, air is injected at the wellhead, causing combustion radiating from the electrode to break down the hydrocarbons and cause the oil to flow.

In the five-spot pattern, air is injected in the middle well, and all five wells contain electrodes.

Oil may be produced on pump through the metal tubing that serves as the conductor to the electrode. This may be done with or without removing the electrode. Oil can also be removed through the well casing by using a casing pump.

Generally speaking, conventional pumping is the procedure, either through the central tubing or the casing.

Electrofrac says it is able to amplify the control of underground combustion and that it has done extensive experimentation in this respect.

Control is in the application of electricity and injection of air, the company says.

A better sweep pattern of a given area can be accomplished, the company adds by electrofracing between wells.

Sarapuu points out that operations were conducted in a shallow field to hold down costs, but that there are no depth limitations on use of the process.

The company is also working on applying electrofracing to the Athabasca tar sands, to oil shales, and to coal seams.

The company says laboratory production of oil from tar sands has been accomplished, and a test pattern has been drilled on Kewanee's Athabasca property in Alberta. In addition, the company has secured another tar-sands site near McMurray for experimental work. Development of equipment for starting work in Canada, however, is being carried out at the St. Paul field station, which serves as a testing ground for the company's techniques.

Electrofrac also got an O.K. from U.S. Asphalt Corp., Sante Fe, N.M., to conduct experiments on its properties near Sulphur, Okla. Tar sands that outcrop there are similar in nature to those at Athabasca, the company says. Resistivity measurements have been made in this area, and several core holes drilled. The site may be used for field testing of equipment before shipment to Canada.

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The F. H. Maloney Company now offers an underwater ferrous metal detector: The *Shellfish*. Manufactured under license from the Shell Development Co., the detector locates pipe lines and crossings buried to depths as great as 15 feet, depending on pipe size.

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What's New / IN PRODUCTION

CO_2 Flood to Get First Use by Major Company

The first use by a major company of a carbonated waterflood is planned by Cities Service Petroleum Co. for a 2,000-acre unit in the Domes pool, near Bartlesville, Okla.

Cities Service has been licensed by Oil Recovery Corp. to use the "Orco Process" in the 10-ft. to 20-ft. Bartlesville sand pay that underlies the unit at a depth of 1,800 ft.

Carbon dioxide required for the Domes project will be hauled in special highway transports and unloaded into refrigerated tanks. The CO_2 will be metered through injection lines to the bottoms of input wells.

Initial injection is scheduled for May, now that approval for the project has been received from the Osage Tribal Council.

Cities Service engineers estimate the program will yield an additional 6-million bbl. of secondary oil.

•

Industry Groups Hit Federal Land Proposal

Three petroleum associations are objecting to federal proposals to establish a national wilderness-preserve system.

The three—Western Oil & Gas Assn., Rocky Mountain Oil & Gas Assn., and Independent Petroleum Assn. of America—presented to the Senate Interior Committee last week testimony that reflected concerted disapproval of block protection of public domain against petroleum prospecting.

Robert B. Laughlin, of RMOGA, said establishment of wilderness preserves "would carve out vast areas and simply insulate them against serving any useful purpose whatever, other than extremely limited recreational use."

Henry W. Wright, of WOGA, recommended that wilderness legislation be withheld until after public review of a final report from the National Outdoor Recreation Resources Review Commission.

Douglas E. Nelson, of IPAA, said: "National forest and national park lands involved in this bill are not at present of general interest to petroleum prospectors." But he added, "the [proposed] procedure of wholesale withdrawal from multiple use as provided in [the bill] is inadvisable."

•

Oil exploration activity is quickening in southwestern Washington.

The state government has granted permits for three new ventures, and has awarded leases on 5,862 acres of land in Lewis and Pierce Counties.

Humble Oil & Refining Co. will drill two of the holes, and Sunshine Mining Co., Spokane, the third. The Humble tests, No. 1 Rosa Meyer, section 15-11n-1e, and No. 1 Everett Trust & Savings Bank, section 23-13n-1e, will be drilled 20 mi. southeast of Chethalis, Lewis County, by Exploration Drilling Co.

The Sunshine test, No. 1 Beach, in the Ocean City area of Grays Harbor County, will be drilled by Petroleum Services, Inc.

Among the lessees in Lewis and Pierce Counties are Humble, with 3,800 acres, and Texaco Inc., with 900 acres.

•

Mississippi's Oil & Gas Board has approved unitization plans for the 150-well McComb oil pool, Pike County. It is the first unitization order the board has issued since 1956.

The approval was sought by Sun Oil Co., major operator in the pool, and 17 independent operators, as a preliminary step in their plans to boost recovery and halt the pool's bottomhole pressure drop by a water injection repressuring project.

Unitization of interests in the pool will be on a voluntary basis, the Board said. Sun said that 73% of the royalty owners and 87% of the pool's operators have agreed to unitize their interests.

•

All drilling equipment of Milhoan Drilling Co., including three rotary rigs and miscellaneous accessories, has been acquired by Lucey Products Corp., Tulsa. The rigs are located in West Texas and New Mexico.

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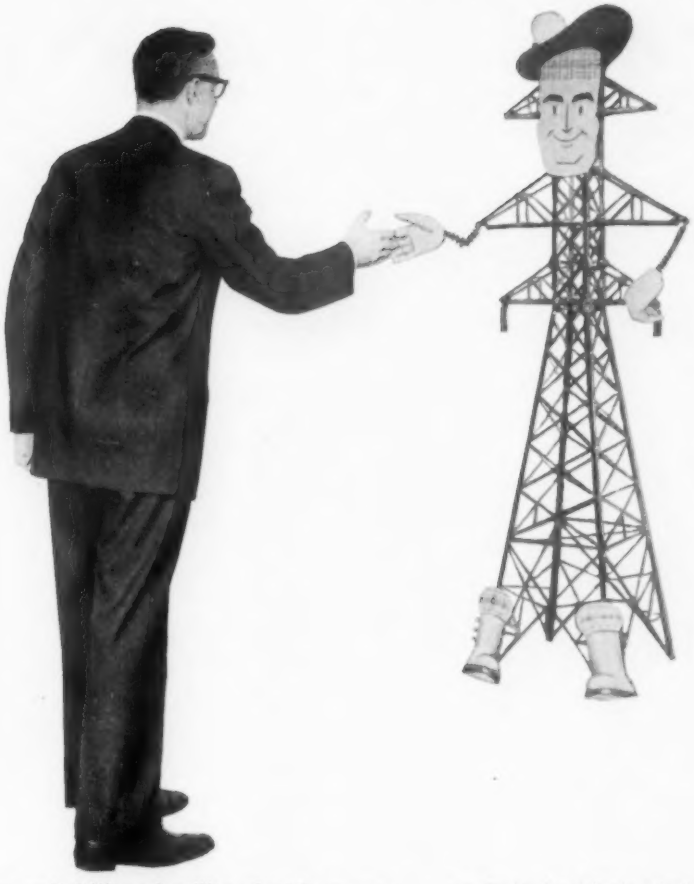
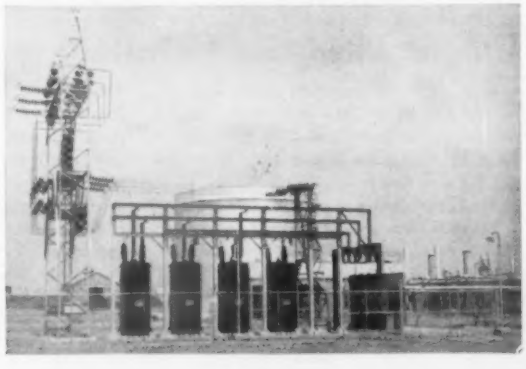
Old oil derricks in the Los Angeles area may soon be razed if the city's planning commission adopts an ordi-

Memo to Management:

STOP WASTE...
with efficient power



The increasing availability of utility electric power has made it more and more useful in the current drive to stop waste of time, money, and manpower. The many economies of utility electric power have made it the ideal solution to problems in pumping, waterflooding, gathering, transmission as well as refining. For the latest facts on purchased electric power, consult your Utility Electric Power Company.



PETROLEUM POWER ELECTRIC ASSOCIATION

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A list of P.E.P.A. members will be furnished on request.

nance proposed by William L. McCoy, city petroleum administrator.

The ordinance would require operators to eliminate noise and odors from these old well-sites, and to screen them from public view. Further, it would call for the removal, within 30 days after the completion of drilling a new hole, of all derrick equipment.

•

Engineering

A Preferred Logging Program that shows at a glance the correct log or combination of logs for every use under varying hole conditions has been published in brochure form by Lane-Wells Co., Houston, one of the Dresser Industries.

The program also lists, geographically, all the major areas of oil activity in the U.S. for easy reference.

The brochure, No. PL-261, is available on request from Lane-Wells Co., P.O. Box 1407, Houston 1, Tex.

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Drilling Highlights

New Mexico—Phillips Petroleum Co. No. 9 Leamex, section 16-17s-33e, Lea County, was completed as a Wolfcamp oil discovery flowing 276 b/d of 40-gravity oil through ½-in. choke and series of perforations between 10,622-722 ft. The well is 5 mi. southwest of Wolfcamp production in the Kemnitz pool.

Also in Lea County, Nearburg & Ingram No. 1 Midhurst, section 35-12s-37e, flowed 433 bbl. of 54-gravity oil in 20 hours through 22/64-in. choke and perforations at 11,119-24 ft. in the Pennsylvanian. The well was completed earlier as a ½-mi. east extension of Devonian production in the Gladiola pool.

South Louisiana—John W. Mecom No. 1-S LL&E, Plaquemines Parish, was drilling past 15,552 ft. in sandy shale and shale this week. A 17.6-lb. gypsum-ferrochrome, ligno-sulfonate-lignitic-emulsion type mud is now being used on the deep test, which is equipped to go to 26,000 ft. (PW—Feb.10'61,p20).

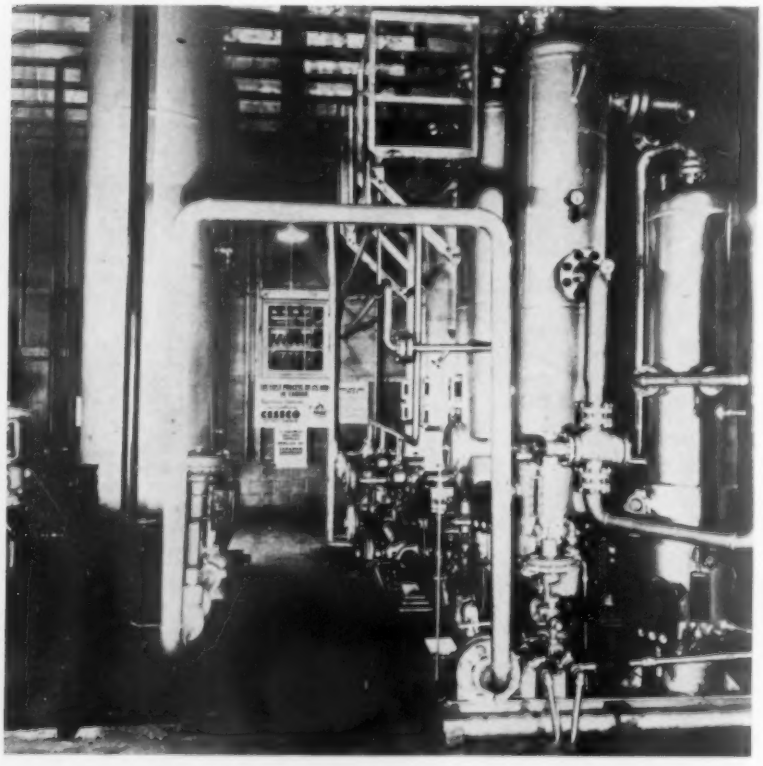
Colorado—Frontier Refining Co. No. 1 Christiana-Govt., section 9-9s-101w, Mesa County, flowed gas at the rate of 25.5-million cf/d while drilling in the Morrison at around 2,600 ft. The wildcat is 2 mi. northwest of the one-well Asbury Creek field.

East Texas—Humble Oil & Refining Co. No. 1 W. K. Savage, Josiah Walker survey, Van Zandt County, has opened Rodessa (lower Cretaceous) oil production of the northwest flank of the Grand Saline salt dome. The well was completed for 100 b/d of 46.4-gravity oil through ¼-in. choke and perforations at 8,290-300 ft. Nearest production is 3½ mi. southwest, in the Southeast Fruitvale pool, which also produces from the Rodessa.

Oklahoma—Mobil Oil Co. No. 1 Horton, section 14-15n-15w, Custer County, 7 mi. east of North Custer City pool, flowed 800,000 cu. ft. of gas and 31 bbl. of condensate in 18 hours through ⅜-in. choke and a series of perforations in the Meramec at 13,196-309 ft.

West Texas—Mobil Oil Co. No. 1 Banner-State, section 332, RW&NG survey, Terrell County, was completed as a Strawn gas discovery for 21.5-million cf/d of gas on open flow through perforations at 11,205-642 ft. The well earlier was completed as 1¾-mi. northeast extension to Ellenburger production in Brown-Bassett field, flowing 165-million cf/d of gas through perforations at 13,370-423 ft. and open hole at 13,423-529 ft.

In Garza County, Shell Oil Co. No. 1 W. M. Kirkpatrick, section 3, block 2, GH&H survey, was completed for 199 bbl. of 37.6-gravity oil and 93 bbl. of water on the pump in 22 hours through perforations at 7,903 ft., 7,915 ft., and 7,917 ft. The Pennsylvanian discovery is 5½ mi. northeast of North Texas (Strawn and Ellenburger) pool.



Unique Field Gas Unit Built in Canada

Sage Oil Co.'s scrubbing plant, said to be the first of its kind in Canada, treats natural gas at the wellhead with two units built by Canadian Equipment Sales & Service Co., Ltd.

Marketable gas and gasoline byproducts are drawn from the gas stream by a Dynamic Adsorption Unit in combination with a Selective Adsorption Unit.

The "DAU" captures water vapor and heavy hydrocarbons through an activated silica gel bed, which is periodically "scrubbed," or cleaned, by heated gas. From the "DAU," the gas stream is passed through the "SAU." Here, hydrogen molecules are removed from the stream in two pressure vessels filled with calcium alimino silicate.

The plant, which cost $100,000, treats gas from the company's "Octave" well in the Leduc field, and is located near Edmonton. The well has an allowable of 6.87-million cf/d of gas and 50 bbl. of condensate per million.

Rugged joint of Extreme Line tubing permits repeated make-up and breaking out without galling. Operators like the fast make-up that results from the integral design.

Why operators prefer SPANG Extreme Line Tubing

Streamlined design of integral joint SPANG Extreme Line tubing eliminates the need for couplings. The high strength joint provides a metal-to-metal seal that resists leakage in the deepest, high pressure wells.

Extreme Line joints are streamlined internally and externally, minimizing possibility of hanging up or stripping under pressure. Integral joint eliminates 50% of the threaded connections in conventional designs.

Wide, heavy, modified Acme threads speed joint make-up with minimum chance of cross-threading.

SPANG Extreme Line tubing is readily available in grades J-55, N-80 and P-105. It rounds out National Supply's complete tubing line for every specific application. Call your National Supply representative for complete information, or write to National Supply Division, Armco Steel Corporation, Two Gateway Center, Pittsburgh 22, Pennsylvania.

See next pages for more information on Spang tubular products

Why SPANG Extreme Line Casing out-performs other casing in deep, high pressure wells

Unique metal-to-metal seal makes SPANG Extreme Line casing 100% leak resistant. Precision machined seals on box and pin ends of the casing bear up under the heaviest loads in tension and compression.

Integral joint eliminates couplings. The joint design provides greater strength with considerable reduction in diameter.

Cross threading is practically impossible. Any initial misalignment is automatically corrected by the broad, flat-crested threads which guide the pin quickly into positive engagement with the box.

Extreme Line casing can be re-run many times without galling. The sturdy, Acme-type threads afford higher recovery than API casing, without rethreading.

This advanced design reduces the number of threaded connections to one-half those required with T&C casing, as the coupling element is an integral part of the casing.

Extreme Line casing is available in Grades J-55, N-80 and P-110. Your National Supply representative will be happy to discuss the basic advantages of this casing with you. Or you can get complete details by writing to National Supply Division, Armco Steel Corporation, Two Gateway Center, Pittsburgh 22, Pennsylvania.

Extreme Line casing is just part of the National Supply complete line of oil country tubular products. Spang drill pipe and National drill collars were also used in this Louisiana well.

Why SPANG Drill Pipe and Tool Joints are the logical choice for your drilling program

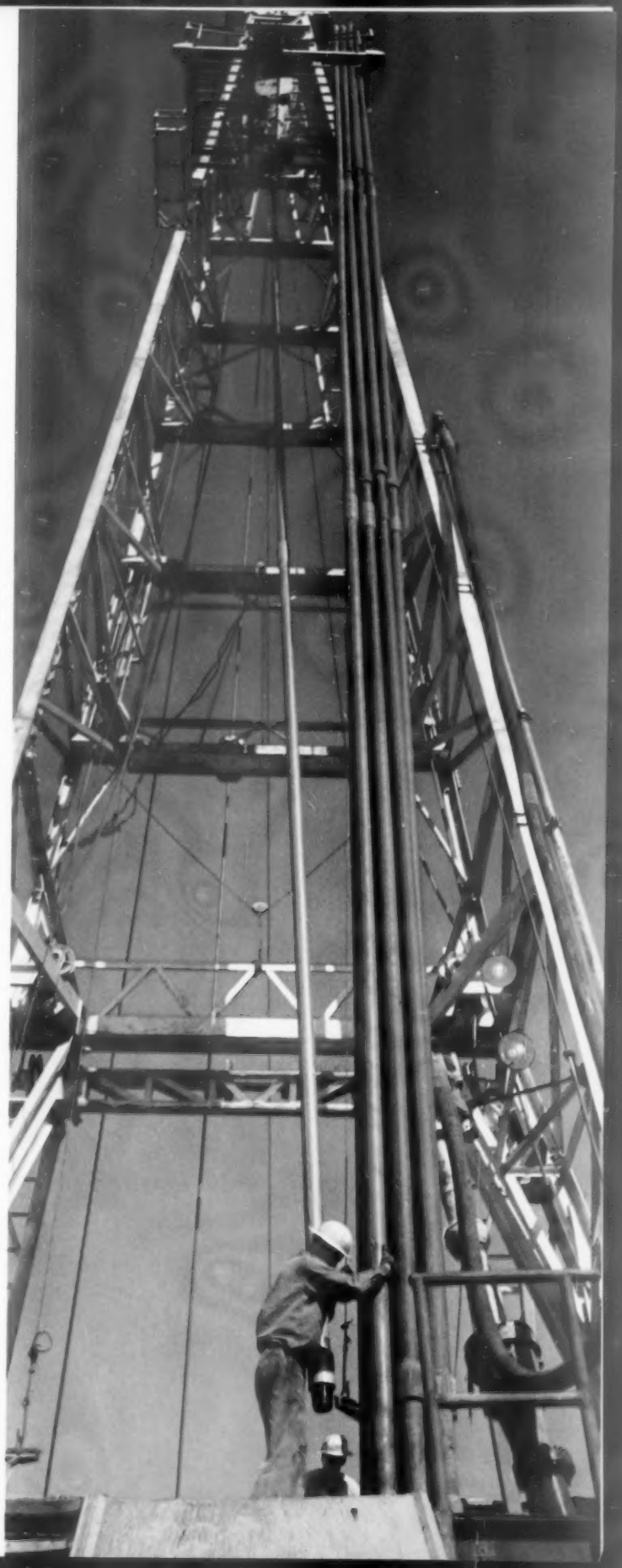
SPANG drill pipe is specifically engineered to minimize leakage, fatigue, tension and corrosion. Operators have found they can depend on it for fast, dependable performance. There is also an advantage in the fact that National Supply is the only company that manufactures both drill pipe and tool joints.

Spangweld drill pipe and tool joints provide fast, dependable operation. The tool joints are welded to the drill pipe by an automatically controlled operation that insures accurate alignment and a high quality weld. Welding permits a streamlined contour and a reduced number of threaded elements. This tool joint connection also allows a small O.D. and maximum bore — a definite advantage for slim hole drilling.

Another field-proven SPANG drill pipe product is the Double Seal Shrink Thread tool joint. This joint is designed with two distinct seal areas — one internal and one external. The threads have no sealing function to perform. The two sealing surfaces and the shrink thread design result in a joint that is leakproof and minimizes possibility of washout. The tool joints can be removed and replaced easily in the field.

Both of these drill pipe products are available with SPANG Hardfacing, a superior protection for tool joints in abrasive formations. It consists of multiple bands of tungsten carbide, continuously over-lapped on the joint to form a solid particle-to-metal band.

SPANG drill pipe is readily available in every diameter and type now in use. Consult your National Supply representative for details, or write direct to National Supply Division, Armco Steel Corporation, Two Gateway Center, Pittsburgh 22, Pennsylvania.



Spang drill pipe is field-proven in the toughest oil country applications. It is available in a full range of sizes.

Steel

Steel's Symbol of strength, long life, and economy

This Spang CW pipe is used in gathering lines in this California operation. The pipe has wide application in gas, oil and water gathering lines.

MOST DEPENDABLE STANDARD PIPE IN THE WORLD... SPANG CW Pipe

Superiority of SPANG CW steel pipe is due to the strictest possible quality control in every manufacturing step. This quality control pays off in uniformity and dependability.

Every length of SPANG pipe is hydrostatically tested and inspected for thread quality. The uniformity of this pipe can save you many hours in laying gathering and feeding lines. And most important, there is no premium price for SPANG quality. All sizes, plain end or threaded and coupled, are available now.

Next time you buy pipe, call your National Supply store. You'll find the pipe is easy to cut, bend, thread and weld. For name of your closest source of supply, just write to National Supply Division, Armco Steel Corporation, Two Gateway Center, Pittsburgh 22, Pennsylvania.

ARMCO National Supply Division

GAS LINE is coated against corrosion and pulled into Mississippi during Transcontinental loop-building program in which . . .

Work Time Is Cut on River Crossing

The techniques of crossing a river with a pipeline—once considered a formidable task—have now become pretty much routine. Witness the experience of Transcontinental Gas Pipe Line Corp.

There are 76 rivers on the route of Transco's 1,800 mi. pipeline system, from Texas to New York City.

Transco's lines cross under 72 of them and bridge the remaining four by aerial suspension.

When Transco laid its first line, which was put in service in 1951, the company and its contractors looked on rivers as major obstacles. Crossings still require careful planning, but in contrast, today they are considered a routine part of a pipeline job.

Transco recently pulled two dual lines under the Mississippi in 27 days—including a four-day weather delay—which is one-third the time it took to make similar crossings when the company built its first main line.

Site of the crossing is the New Roads-St. Francisville area of Louisiana.

At this point, the Mississippi River is normally 3,000 ft. wide and 45 ft. deep.

The four lines were buried in a ditch, which was dredged 20 ft. deep by 440 ft. wide at the top and between 40 ft. and 50 ft. at the bottom.

One of the lines consists of a dual 30-in. pipeline, which is part of a new loop being built by Transco under a second looping program begun three years ago.

When this program is completed, Transco will have three lines in its main system.

Dual lines were installed under the river, so that if one broke down, the other could still be used to provide uninterrupted gas service.

The other line consists of two 10¾-in. lines, which will form part of the LPG pipeline being constructed for Trans-Southern Pipe Line Corp., the new Transco subsidiary.

The liquids system will go into operation this fall (PW—Sep.30'60, p11).

The techniques used in the latest crossings were evolved by Transco during a decade of pipeline expansion.

Houston Contracting Co. did the job, using some equipment developed by Collins Construction Co., Port Lavaca, Tex.

The work area was on the east bank of the Mississippi, and the pipe was pulled into the ditch from the west side.

First, the pipe was covered with a ⅜-in. coating of somastic—an asphalt and sand aggregate mixture. Then it was wrapped and coated with a 2½-in. layer of heavy aggregate concrete.

DIVER submerges to check the condition of ditch and position of pipeline.

There were 14 sections in all—three for each of the 30-in. lines and four for each of the 10¾-in. lines. The sections were pulled as duals.

The first section was plugged and

pulled almost entirely into the river by a 90,000-ft./lb.-capacity winch. Then, the second section was joined to the first and pulled in, then the third section.

Steel drum pontoons were attached to every 50 ft. of pipe to lend it buoyancy.

And a locating buoy was set above each pontoon.

When the pipe was in place, a trigger mechanism was actuated by a winch on a barge in the river, which released the pontoons and buoys for recovery.

Canadian pipelining outlook:

Decline, Followed by Upsurge

Pipeline building in Canada will slow down for the next four or five years, followed by an upsurge spurred by a need for more capacity to meet increased gas demand, according to a prediction by Dr. George W. Govier, deputy chairman of the Alberta Oil & Gas Conservation Board.

Govier made his prediction at the recent annual meeting of the Pipe Line Contractors Assn. of Canada, in Victoria, B. C. He pointed out that the construction decline will set in this fall upon completion of the new pipeline system in Alberta to carry gas to the U.S. (PW—Oct.14'60,p57).

By 1964 or 1965, the pipeline systems of Alberta Gas Trunk Line Co., Ltd., and Trans-Canada Pipe Lines, Ltd., will have reached their ultimate capacities, Govier feels.

This fall, total capacity of the Alberta Gas system—including its Foothills Division and its Plains Division—will be 1.4-billion cf/d.

Ultimate design capacity of the Alberta Gas system is 2.1-billion cf/d, which, Govier indicates, will be achieved by 1964 or 1965 through the installation of some compressors and a few laterals.

Capacity of the Trans-Canada system this fall will be 1⅓-billion cf/d, which can be boosted to an ultimate capacity of 2-billion cf/d by the addition of compressor horsepower and the building of some loops, Govier said. These new facilities will probably be constructed by 1964 or 1965.

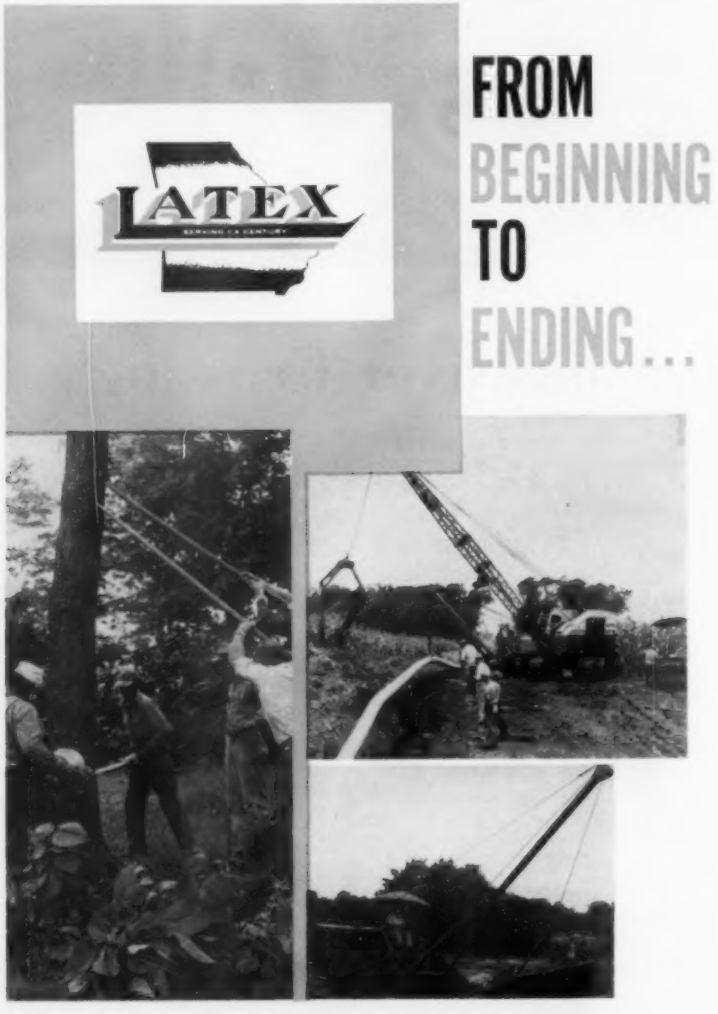
Only 4,200 inch-miles of pipe—the equivalent of 230 mi. of 18-in. line—are likely to be built in Alberta in the next four or five years, Govier said, and only minor looping is expected on lines outside the province.

"However, those are only the prospects for the next four or five years," Govier emphasized. "By 1964 or '65, the trunk-lines system [in Alberta] will be at capacity, and further growth in surplus and in supplying of markets will result in the development of either completely new main trunk lines, or of major loops in the existing trunk lines system." He predicted similar growth in construction of pipelines running east from Alberta.

Govier estimated that each year, from 1964 or '65 on, between 2,400 and 3,200 inch-miles of pipeline will be built in Alberta—equal to between 120 mi. and 160 mi. of 20-in. line.

"This will include new trunk lines, with a small 't' of course; looping of existing trunk lines . . . and the construction of new laterals to new fields."

Between 7,000 and 9,000 inch-miles will be added to pipeline systems outside Alberta each year from 1965 to 1970, according to Govier. This construction will amount to the equivalent of between 1,000 mi. and 1,300 mi. of 34-in. line in five years.



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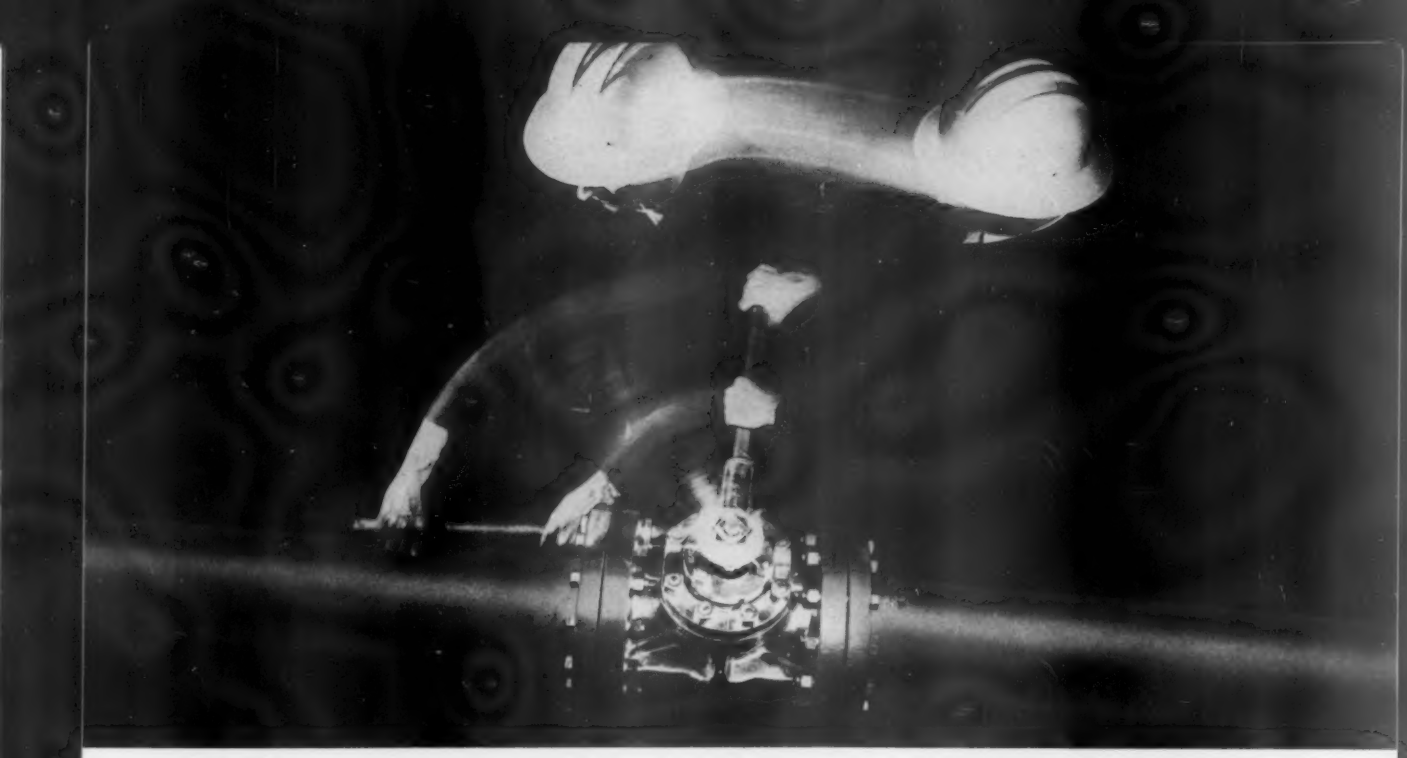

Stroboscopic photo shows fast, smooth quarter turn closure of Rockwell-Nordstrom lubricated plug valves.

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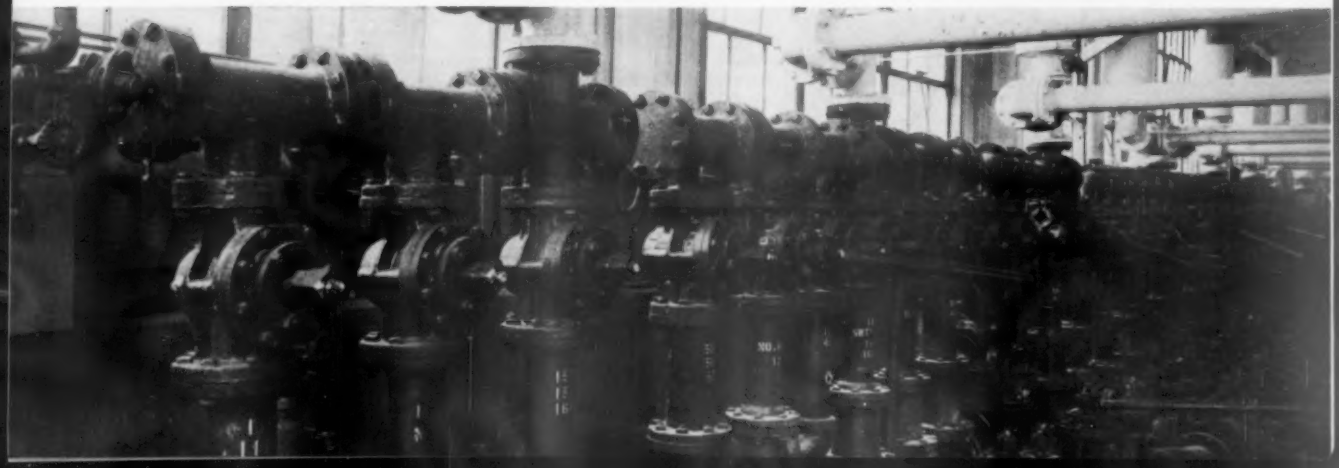
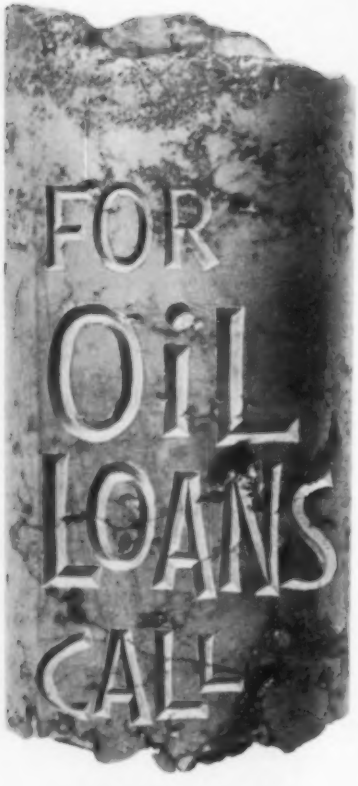


HARRY L. DEDMAN, Vice President, Petroleum Engineer, and Manager of Texas Bank's Oil Department.



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What's New / IN TRANSPORTATION

The Federal Power Commission has authorized Houston Texas Gas & Oil Corp. and Coastal Transmission Corp. to spend $23,401,000 to enlarge their gas pipeline system from Texas to Florida.

Coastal Transmission owns and operates the first part of the system, which runs from McAllen, Tex., to Baton Rouge. Houston Texas owns and operates the rest of the system to Miami.

Houston Texas will spend $16,126,000 to build 235 mi. of sales laterals and to boost its compressor capacity by 30,000 hp. The expansion will enable the company to increase its maximum deliveries by 93-million cf/d.

Coastal Transmission will construct 71 mi. of supply laterals and add 12,500 hp. to its compressor output at a cost of $7,275,000, which will hike capacity of its portion of the system by 97-million cf/d.

•

Texas Eastern Transmission Corp. is mining a 150,000-bbl. cavern at Princeton, Ind., to store propane for delivery in a tri-state area.

Trucks will transport the propane to markets in southwestern Indiana, southeastern Illinois, and northern Kentucky, starting next winter.

The new storage terminal will be supplied by pipeline from TET's salt dome storage depot at Mont Belvieu, Tex.

•

Standard Oil Co. (Ind.) might fade from the Alberta gas liquids export picture unless the proposed Westalta-Foothills pipeline is approved.

This was indicated by P. J. Perille, assistant manager of Standard's crude planning department, at recent hearings before the Alberta Oil & Gas Conservation Board.

When asked whether Tuloma Gas Products Co., Standard's subsidiary, would use the line of Interprovincial Pipe Line Co. and its proposed extension to Chicago to carry liquids it wants to buy, Perille replied that Interprovincial must show that it can provide cheaper transportation and that it has not done so.

Interprovincial has set an Edmonton-to-Chicago tariff of 55¢ per bbl. for shipments of 20,000 b/d, and of "less than 40¢" for batches of 50,000 b/d or more (PW—Feb.17'61,p71).

Perille asserted that "if Foothills (and Westalta) do not build their line, there will be no competition and Interprovincial would be required by law to charge . . . a rate much higher than 55 cents."

Westalta Products Pipe Line, Ltd., and Foothills Pipe Lines, Ltd., propose a tariff averaging 46¢ over a 25-year period.

•

Mohawk Petroleum Co., Tulsa, has bought the operations of Beebe Crude Oil Purchasing Co., a Muskogee (Okla.) trucking firm.

The sale involved all of Beebe's crude purchasing and transportation facilities, including three crude transports and two delivery stations.

The purchase price has not been announced.

Mohawk had earlier this year purchased Helms & Beckham, another crude oil trucking firm.

•

The first tanker designed to carry refrigerated LPG (—40F) at essentially atmospheric pressure is slated for completion in Japan by early next year.

The vessel, which will have a capacity of 180,000 bbl., will haul LPG from Kuwait to Japan (PW—Mar. 3'61,p42).

The ship is being built by Mitsubishi Nippon Heavy Industries, Ltd., for Bridgestone Liquefied Petroleum Gas Co., Ltd. It was designed by Conch International Methane, Ltd., which owns the Methane Pioneer, the first tanker developed to transport liquefied methane (PW—Jan.22'60,p 59).

•

Three budget-type construction programs by pipeline companies have been approved by the Federal Power Commission.

In each case, the company has been authorized to spend a blanket sum of money this year to construct new facilities, with the cost of any single project limited to $500,000.

Natural Gas Pipeline Co. of America has been authorized to spend $3.5-million; American Louisiana Pipe Line Co., $3-million; and Transwestern Pipeline Co., $3-million.

AT COSDEN . . .

After five years' experience in operating Combin-aires, Cosden Petroleum Corporation, at its Big Spring refinery, has installed its FOURTH Hudson Combin-aire.

The Combin-aire is an integrated structure combining a water cooling tower with fin-tube hot fluid to air exchangers. Ambient air is cooled as it is drawn thru the water, and the cooled air serves as the cooling medium for the fin-tube coolers. Thus, with fin-tube coolers, effluent process stream temperatures may be reduced far below those obtained with ambient air.

The Combin-aire may be used primarily as a cooling tower, with the advantages of double use of air, and, because hot effluent air is undersaturated, complete elimination of spray carry over or condensation. Or when water is scarce, or salt, or brackish the Combin-aire may be used primarily for fin-tube cooling, using minimum water of any quality for pre-cooling air.

DEPENDING UPON DESIGN OBJECTIVES THE COMBIN-AIRE MAY HAVE SOME OR ALL OF THE FOLLOWING ADVANTAGES:

- Absolute minimum water consumption consistent with attainment of low terminal process stream temperatures.
- Water circulation may be made automatically responsive to air temperatures with no water circulated except at high ambient temperature.
- No water treatment necessary. Salt water or brackish water may be used.
- No spray carryover or condensation. After passing across the fin-tube elements the heated air leaving the Combin-aire at elevated temperature is undersaturated with water vapor and cannot precipitate condensate or carry water spray.
- Minimum piping. Combin-aire may be installed immediately adjacent to other process equipment.
- Clean air to fin-tube units. During the hot season air is washed, removing dust, sand and insects.

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In the brief few months since the introduction of Du Pont TETRAMIX* antiknock compound, refiners have found that it offers a new degree of flexibility in their choice and use of lead antiknocks. For example, while its effectiveness varies with gasoline composition (as is true with other antiknocks as well), TETRAMIX is generally effective in low, medium and high dosages.

Results of tests to date indicate that TETRAMIX is also a more effective antiknock in some fuels than either tetraethyl or tetramethyl lead —that is, a given octane number can, in such fuels, be obtained with lower concentrations of TETRAMIX than with TEL or TML.

Based on this refining flexibility and the potential savings it offers in blending, TETRAMIX antiknock compound has already won refiners' acceptance. With commercial quantities available, now is the time for *you* to investigate the potential advantages of TETRAMIX.

Because you have a choice of all three major lead antiknocks at Du Pont, you'll get impartial help in selecting the best one for *your* gasoline stocks. Your Du Pont Petroleum Chemicals Division representative can assist you in evaluating the relative merits of TEL, TML and TETRAMIX.

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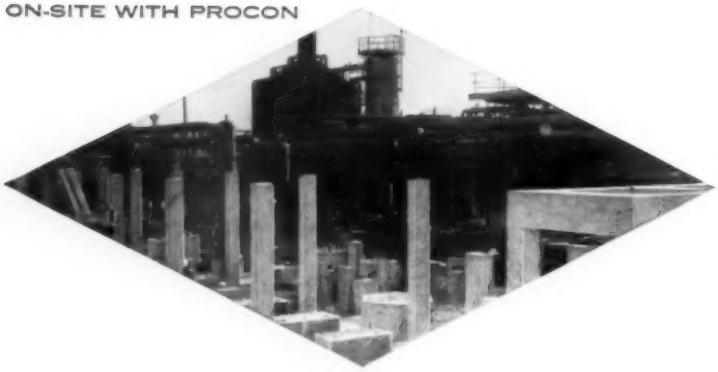

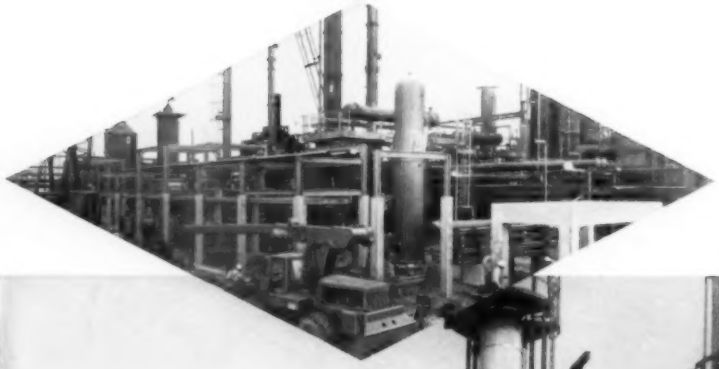

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How to Make More Hydrogen Cheaper

Petroleum refiners will soon need so much hydrogen that they will have to turn to sources other than catalytic operations.

Thus far, hydrogen requirements in refineries have generally been met with the byproduct hydrogen from cat reforming. But so many new processes now call for hydrogen that supplemental quantities will have to be produced.

For example, there are more and more hydrocracking processes such as Unicracking, Isocracking, Lomax; hydropurification processes such as Unifining, Hydrofining, and Ferrofining; conversion techniques requiring substantial quantities of hydrogen, such as the Oxo, Hydeal, and Detol processes.

Meanwhile, other demands for hydrogen continue to increase. For instance, the production of both ammonia and methanol is growing steadily, and both use hydrogen.

Hydrogenation processes are also increasingly popular in the nonpetroleum areas of both organic and inorganic chemistry. And last but not least, hydrogen is being used as a high-energy rocket propellant.

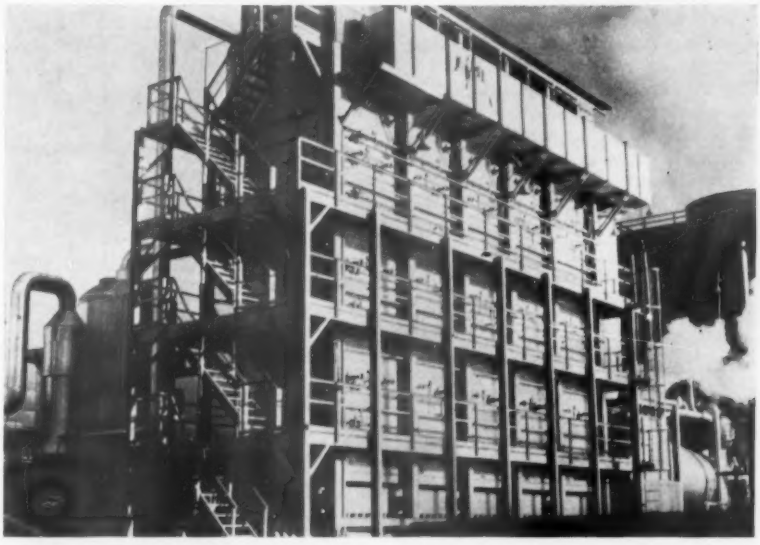
To meet this rising demand economically, significant improvements have been brought to that most common method of producing hydrogen: the catalytic reaction of steam and light hydrocarbons.

Maurice R. Kitzen, chief process engineer of Selas Corp. of America, and Jack Tielrooy, a California consulting engineer, described these improvements at last week's meeting of the American Institute of Chemical Engineers, in New Orleans.

The basis of the process has not been changed: It consists of reacting a preheated mixture of steam and light hydrocarbon gas over a nickel catalyst at high temperature.

Unfortunately, the effluent stream from the reactor is a mixture of hydrogen with carbon monoxide, carbon dioxide, steam, unreacted methane, and the inert gases present in the feed gas. Of these products, carbon monoxide is present in the largest volume. So purification stages must follow the cracking operation.

These improvements can be achieved by carrying out the process at higher pressures, and by operating at high space velocities and high tubeskin temperatures.



HYDROGEN FOR AMMONIA SYNTHESIS is produced by steam cracking of methane, in this unit constructed by Selas Corp., Dresher, Pa. It contains 82 tubes of 4 in. diameter, with 30 ft. of heated length. The firebox is 6 ft. wide and 43 ft. long, and is fired with 140 radiant gas burners, 70 on each side.

Two distinct reactions must be considered: the actual steam cracking of the hydrocarbons, and the subsequent reaction of carbon monoxide with steam, in a shift converter, to give hydrogen and carbon dioxide.

Conditions such as temperature, pressure, and steam-to-carbon ratio that are favorable to one of these two reactions may not necessarily be the best for the other, the speakers pointed out. Thus it is important to reach an optimum equilibrium.

It is, for example, economical to operate at high pressure, so as to save on compressor power. But in order to do this without reducing the effectiveness of either reaction, a high steam-to-carbon ratio must be maintained. Likewise, high temperature favors the initial cracking part of the process, but affects the CO conversion adversely.

Design of the catalyst tubes is also of prime importance, the speakers said; their length and diameter determine how they are affected by temperature.

These improvements have become possible because of improved catalysts, improvements in tube metallurgy, and improvements in furnace design, particularly with regard to heat distribution.

Furnace equilibrium temperatures in the vicinity of 1,400F at the outlet account for tubeskin temperatures between 1,600F and 1,800F.

But a multiplicity of gas burners will produce a uniform pattern of radiant heat within the furnace, with lower tubeskin temperatures.

When figuring the optimum design for a catalytic reactor for hydrogen production, it is essential that the entire installation be taken into consideration, including auxiliaries such as waste heat boilers and shift converters, the speakers explained.

For example, the temperature of the gas leaving the reformer may be high, they said; thus, to get best economy from the unit, the reformer should be followed by a waste heat boiler to cool the gas to around 500F.

Likewise, it is economical to use plenty of steam for the cracking reaction, and to make use of the excess steam that leaves the reactor for the conversion of the carbon monoxide. This, the speakers said, has many advantages. Among them:

- Equilibrium outlet temperatures are lowered due to higher steam concentration.
- Heat transfer is improved, due to increased mass flow, resulting in lower tubeskin temperatures.
- A high CO conversion is obtained.

Future Bright for Propylene Products

The substantial increase in the demand for propylene and propylene derivatives as petrochemical starting materials can easily be met by refiners, without handicapping in any way the yield or the quality of their gasoline or other products, H. A. Mitchell, of Shell Chemical Co., told the meeting of the American Institute of Chemical Engineers, in New Orleans last week.

Propylene in the U.S. comes from two sources:

- Cracking operations in refineries, which accounts for about 90% of the propylene produced;
- Cracking of propane or heavier feedstock, which produces simultaneously propylene and ethylene.

The total propylene potential from these two sources is estimated at about 20-billion lb. per year. Only 2.1-billion lb. of propylene were used as chemical raw materials in 1959, according to reports to the U.S. Tariff Commission. This leaves an enormous quantity which, at present, goes into the components of gasoline.

A substantial portion of this propylene can be—and no doubt will be—used for petrochemical purposes in the future. "With so many oil companies in the chemical field," Mitchell said, "alternative means of meeting the gasoline demand will be used, and will assure an adequate supply."

Isopropyl alcohol, in the order of 1-billion lb. per year, is the largest-volume derivative of propylene that goes into chemical manufacture today.

Propylene was actually the first petrochemical raw material. Isopropyl alcohol was prepared towards the end of World War I: It was used to make acetone, for which there was a great military demand, as an aircraft fuel additive.

Today, a large proportion of acetone comes as a byproduct of phenol synthesis via the cumene route; this process also depends on propylene as initial raw material. As acetone demand continues to grow, so will propylene consumption.

The second largest chemical use for propylene is for the production of low-molecular-weight polymers, such as propylene trimer—nonene—and tetramer—dodecene.

These represented a consumption of about 570-million lb. of propylene in 1959, for the making of synthetic detergents.

These two polymers are in serious competition today: The trimer is used to make nonyl phenol, for nonionic surfactant production; the tetramer goes into dodecylbenzene sulfonate and anionic detergents.

Regardless of which of these two polymers captures the bulk of the market, propylene demand will increase.

A relatively new process that uses propylene and its derivatives for the making of chemicals is the Oxo process (PW—May22'59,p28).

Here propylene, propylene trimer and tetramer, and heptene—produced by copolymerization of propylene and butylene—serve as raw materials for the production of high-molecular-weight alcohols and aldehydes. The outlook is good for the growing utilization of these Oxo products.

Propylene oxide and its derivative, propylene glycol, also have an attractive future, Mitchell said, because of their promising outlets in the manufacture of polyether urethane, polyester resins, surface-active agents, and other polymers.

Two new processes for the synthetic production of glycerine are propylene-based.

In 1960, half of the U.S. production of glycerine was synthetic. One process is based on the use of allyl chloride; the other on the reaction of hydrogen peroxide and acrolein. All of these raw materials come from propylene. Shell Chemical Co. has recently put on stream, at Norca, La., a new plant for the application of the second of these processes. Its production of glycerine will exceed 30-million lb. per year.

But the most promising and most competitive outlook for increased propylene utilization is in the broad field of polyolefins.

Mitchell includes in that category the new polypropylene developments, as well as the progress made in the copolymerization of propylene and other olefins.

Eastman Chemical Products, Inc. has joined the growing number of manufacturers that believe in a bright future for polypropylene, and has started making it.

Its manufacturing division, Texas Eastman Co., has put on stream at Longview, Tex. a plant to produce 20-million lb. of polypropylene a year.

Eastman has two new catalytic processes, which, says L. K. Eilers, Texas Eastman's president, are improvements over the conventional Ziegler-Natta process for making linear, atactic polyolefins. Their advantages, according to Eilers: the product contains less ash, is clearer and glossier, has a superior flow rate (a property important to plastic processors), and a much greater resistance to repeated flexing.

Natural Gasoline Plant Runs Itself

The extraction plant of Phillips Petroleum Co. in Puckett field, Pecos County, Tex., has been running virtually by itself for nearly two years. It extracts about 18,000 gal. a day of liquids from natural gas, and dispatches it through a 3-in. pipeline to a natural gasoline plant at Crane, Tex. The duties of its single engineer, Kenneth Hursh, consist in checking its operation twice a day, changing the charts of the recorders, and making adjustments to allow for atmospheric temperature changes.

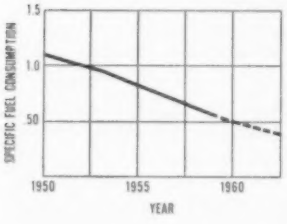
In the event that anything goes wrong, the plant is automatically shut down, and alarms are sounded in the control room and in Hursh's home, 1 mi. away from the plant.

Small gas turbines soon to surpass piston engines for competitive applications

by Herbert Kunzel, President
Solar Aircraft Company
A Subsidiary of International Harvester Company

The gas turbine engine has made news this year as it has expanded into new and broader applications in the prime mover field. Behind this advance is continuing improvement in design and production. Even more advanced gas turbines will be developed in the next few years. In the small engine class (under 1000 hp) gas turbines will soon surpass overall piston engine performance and cost for competitive applications. They will also retain the inherent advantages of the gas turbine over the reciprocating engine.

One of the major reasons for this prediction is an impressive improvement in gas turbine economy. Previously, fuel consumption and high initial cost have kept the turbine out of all but selected power assignments. Industry and the military both thought the engines too expensive for most applications.



Through constant improvement, however, Solar has been steadily bringing simple cycle, small turbine specific fuel consumption down to an area competitive with piston engines. The fuel consumption of Solar's early 50 hp engines in 1948, for instance, was about 2.25 lb/hp-hr. The 1100 hp Saturn engine, which went into production this year, has the excellent simple-cycle fuel consumption of only .63 lb/hp-hr. Solar's experienced engineers improve life, "producibility," and performance characteristics with each new engine. At the same time, production costs are lowering rapidly.

Another significant advance in Solar turbine development has been the evolution of a unique design philosophy. Most gas turbines fall into one of two extreme categories: 1) Lightweight, high horsepower aircraft turbines, built to be as light as possible (about ¼ to ½ lb/hp), and 2) conventional industrial engines designed along the lines of steam turbines with a ratio of about 10 lb/hp. Both have inherent disadvantages. The aircraft turbines are relatively delicate with consequent problems of frequent overhaul and short life. Massive engine design, on the other hand, involves unnecessary bulk and difficulties with thermal lag and distortion. In either case, inherent advantages of the gas turbine engine are diminished and initial cost is adversely affected.

Solar's approach has been to develop a family of gas turbines that have both long life and light weight. The Saturn engine, with a weight-to-power ratio of 1.1 lb/hp, is heavier and more rugged than aircraft engines but much lighter than the usual industrial gas turbine. Although it is designed for long life, it has no more materials than are necessary to satisfy structural and thermal requirements.

Promising even further improvements in the turbine engine is the combination of Solar with International Harvester Company this year. IH saw the advantage of more power per pound several years ago. Their research and development has stressed performance and much work has been done by them on regenerative cycle turbines to reduce fuel consumption.

To basic research, they have added their many years of experience and leadership in high performance and low cost through efficient production of many thousands of IH engines for trucks, construction equipment and farm machinery.

Solar's successful Saturn engine development team and the combined research and resources of the two firms are now focused on further engine development in the area below 1100 hp. Preliminary design for a turbine in this range indicates that the following standards are feasible:

1. A life cycle equal to or better than conventional diesel engines—with considerably less maintenance.
2. Fuel consumption in the .4 to .5 lb/hp-hr range.
3. Cost competitive to conventional reciprocating engines.
4. Inherent ease of starting and operation in a wide variety of climatic conditions.
5. Small size and light weight.

Developments like these are certain to continue the increase in turbine applications and use.

For additional information write to Dept. H-216, Solar Aircraft Company, San Diego 12, California.

Saturn engine powering oil well fracturing unit

SOLAR
A subsidiary of International Harvester Company

How Recovered Heat Saves Power

Installation of CO waste heat boilers and gas turbines on the catalyst regeneration cycle of a fluid cat cracking system generally results in substantial operating cost savings, and a quick payoff.

At this week's Gas Turbine Power Conference of the American Society of Mechanical Engineers, in Washington, D.C., Charles Bultzo, senior mechanical engineer at the Baytown (Tex.) refinery of Humble Oil & Refining Co., made a comparison between the use of such a combination, and a conventional steam turbine installation, to drive the huge air blowers of a cat cracker regenerator.

The initial investment for the CO boiler and gas turbine combination is significantly higher than a steam turbine installation.

For two 5,000-hp. gas turbines, two CO boilers, each producing 179,000 lb. of steam per hour, ductwork, and water-treating facilities, the investment amounts to about $2,165,000.

A conventional installation would cover two steam turbines, plus piping and ductwork for steam and flue gases. Steam, at 600 psi., would be supplied from the existing refinery boiler plant to the steam turbines driving the blowers. Such an installation would not cost over $308,000, Bultzo said.

But this conventional procedure would make it necessary to purchase a substantial quantity of electric power, to compensate for the steam diverted to the new turbines.

But the operating cost saving, of about $820,000 per year, would mean a net return—before federal taxes—of at least 44%.

Operating costs for the CO boiler-gas turbine combination include fuel gas for the turbines and the boilers, maintenance, taxes, and depreciation.

With such an installation, at least one of the refinery boiler houses could be shut down, and the production of the other somewhat reduced.

Actually, two additional factors came into the picture at Baytown. On the one hand, ductwork cost for the gas turbines installation was about 20% higher than estimated. But this was more than compensated for by an increase in the cost of fuel, and related purchased-power cost. So in the final analysis, Bultzo explained, the return was close to 50%.

The main fuel for the waste heat boilers is regenerator flue gas, containing as much as 9% of carbon monoxide. Natural and refinery gas are used only to supplement the regenerator gas.

In addition, the hot exhaust gas from the turbines, containing as much as 17% of oxygen, is mixed with the air admitted to the burners for combustion.

From that combination of recovered fuel and heat comes the bulk of the saving. But an additional economy comes from preheating the boiler feedwater with a portion of the exhaust from the gas turbines (diagram).

The thermal efficiency of the system is above 69%, Bultzo indicated, well above the manufacturers' estimate of 65.7%.

More Armor Cable in Refineries

Use of interlocked armor cable for electrical wiring is becoming increasingly popular in refineries and petrochemical plants, because it is less costly, easier to install, and more flexible than conventional wire and conduit installations.

Under "Recommended Practice" of the American Petroleum Institute, armor cable is acceptable in less-hazardous areas of refineries, but heretofore not much use has been made of it.

API is currently endeavoring to have such installations approved in the National Electric Code.

At the recent meeting of the American Institute of Electrical Engineers, in New York, S. P. Axe, of Atlantic Refining Co., and W. E. Burpee, of Badger Mfg. Co., described an outdoor installation involving some 25,000 ft. of interlocked armor cable at the wax plant of Atlantic's Philadelphia refinery (PW—May 29'59,p66).

When this plant was built in 1959, Atlantic did not want to put any electrical wiring underground, because of the congested pipeline network below grade. It specified overhead conduit and wire, with an alternate of interlocked armor cable, provided the installed cost of the latter did not exceed that of conduit and wire.

In one installation, the weight of armor cable per foot was less than half that of conduit and wire, and its cost was 15% lower.

In the Atlantic wax plant, the armor cable weighed 70 lb. per ft. against 145 lb. per ft. for conduit and wire.

Light-weight, corrosion-resistant, aluminum ladder-type trays, required to support the flexible cable, were readily available, whereas galvanized steel supports for a conduit system would have had to be custom-designed.

The cost of the tray system was practically covered by the savings in actual cable cost, plus the savings in conduit fittings, Axe reported.

Adequate flexible coatings are now available to protect armor cable against corrosion, which has been the main objection against their use.

Plastic coatings are very effective in protecting the galvanized steel armor of the cables. At the Atlantic plant, polyvinyl chloride is used. High-voltage cables—5 to 15 kilovolts—also have an insulation of varnished cambric under the PVC coating.

To prevent galvanic corrosion between the aluminum supporting trays and their galvanized steel supporting brackets, PVC tape is wrapped to a thickness of 20 mils, around the trays at the supporting locations. As a result of this insulation, the trays have to be grounded—about every 100 feet.

The cost of installing an armor cable system in a plant is lower than that of a conduit-and-wire system.

The flexible cables are pulled into place over the trays, with the aid of rollers and pulleys. A basketweave pulling grip is installed over the armor to prevent snagging on the rungs of the ladder-type trays.

The biggest problem, the engineers reported, was to pull the cables around horizontal or vertical offsets in the tray system; such offsets, they recommended, should be kept to a minimum when the system is designed.

Instrument service wires and air tubing can be carried on the same trays as the power cables.

This eliminates the need for separate supports between the control room and the processing units.

Considerable care must be given to cable terminators, and to connections between an armor cable and a conduit and wire system.

There must be no chance for any conducting portion of the cable to be exposed to the hazardous atmosphere, because of the danger of a spark setting off an explosion.

Explosion-proof cable connectors and terminators are now available

another
TRETOLITE SERVICE
report

How TRETOLITE RESEARCH *has paid off*
...in more-salable oil at lower treating cost

It was intensive research that led to the founding of the Tretolite Company in the first place. And a program of continuous research has been at the very core of Tretolite operations ever since . . . and has resulted in the development of the very best and most efficient treating chemicals available anywhere.

THE CASE FOR TRET-O-LITE DEMULSIFIERS

To see what Tretolite research has meant to the producer, let's look at a few then-and-now facts concerning TRET-O-LITE* Chemical Demulsifiers:

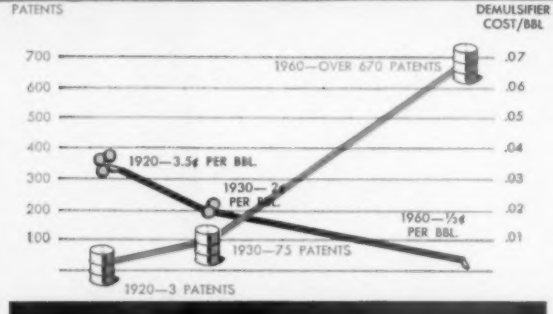
Needless Waste Stopped. Prior to the Tretolite discovery, literally millions of barrels of emulsified crude were thrown away—unusable, unrefinable.

Effectiveness Improved. In the beginning, one drum of demulsifying chemical was needed to recover about 2200 barrels of pipeline oil. Today, one drum will recover nearly 40,000 barrels.

BS&W Specs Reduced. Until 1930, "pipeline specification" for crude was about 3% BS&W. Today, the acceptable maximum is less than 1%—a trend due in large part to the constant improvement of modern demulsifiers.

Drastic Cut in Treatment Costs. In the 1920's, demulsification costs were around 2 to 3.5 *cents* per barrel. Today, in most areas, they are around 2 to 3 *mills* per barrel.

OVER 670 REASONS WHY *IT COSTS YOU* **LESS** *TO GET* **MORE** *SALABLE OIL TODAY!*



Tretolite had just 3 demulsification patents in 1920. By 1930, the number had increased to 75. Today, the Petrolite Corporation, of which Tretolite is a division, holds nearly 700 demulsification patents—nearly 700 reasons why it costs you less than ever before in oil history to treat oil, and provides you with a better, more salable product.

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T-60-2

NEW TOOLS FOR FORMULATING HEATING OILS

PARADYNE® HO-10 and PARADYNE® HO-20 POUR DEPRESSANTS

FOR THE REFINER

Greatly increased freedom to adjust operations and inventories to meet changes in demand. More kerosene available for jet fuel, diesel fuel or other high value outlets. More high pour components receiving heating oil instead of fuel oil value.

FOR THE MARKETER

An end to costly operating difficulties formerly unavoidable in cold weather. Unprecedented flexibility in utilizing available heating oil inventory in almost any weather.

EFFECTIVE AT LOW CONCENTRATIONS

Paradyne HO-10 and Paradyne HO-20, in concentrations of only 0.01 to 0.1 weight per cent can lower ASTM pour points of heating oils variously by 10 to more than 70 degrees Fahrenheit. Either one or both have been found effective in over 90 per cent of stocks tested.

HOW THEY WORK

Paradyne HO-10 and Paradyne HO-20 – both designed specifically for use in heating oils – drastically modify the size and structure of wax crystals formed when heating oil is cooled below its cloud or pour point. The pictures in the centerfold demonstrate their effect.

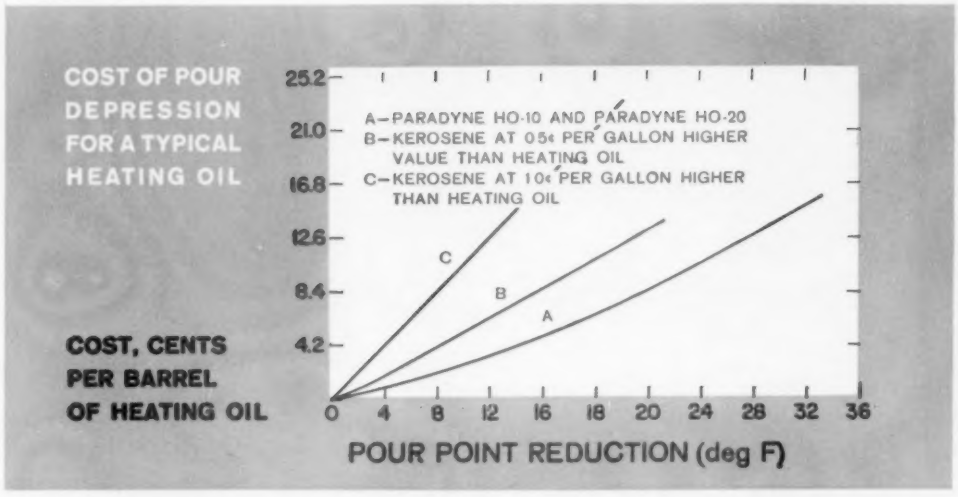
WINTER FIELD TESTS REVEAL OUTSTANDING EVIDENCE...

In addition to extensive laboratory tests, a wide range of field tests have been carried out in Canada and Maine during severe winter climate.

Two heating oils having natural pour points of 20°F and –5° were both depressed with Paradyne HO-20 to –45°F and –40°F. The fuels were evaluated for low temperature flow properties in 12,000-gallon storage tanks, in tank truck deliveries, and in 524 home heating units.

Even though the ambient temperature reached –30°F, good operability was obtained in storage, delivery and customer units.

WAX CRYSTALS
(MAGNIFICATION


COST OF POUR DEPRESSION FOR A TYPICAL HEATING OIL
COST, CENTS PER BARREL OF HEATING OIL
25.2
21.0
16.8
12.6
8.4
4.2
A—PARADYNE HO-10 AND PARADYNE HO-20
B—KEROSENE AT 05¢ PER GALLON HIGHER VALUE THAN HEATING OIL
C—KEROSENE AT 10¢ PER GALLON HIGHER THAN HEATING OIL
C
B
A
0 4 8 12 16 18 20 24 28 32 36
POUR POINT REDUCTION (deg F)

AND HERE'S HOW THESE ENJAY ADDITIVES STACK UP IN COST AGAINST KEROSENE...

The cost of lowering the pour point of a typical heating oil with Paradyne HO-10 or Paradyne HO-20, compared with kerosene may be seen here at a glance.

BLENDING FLEXIBILITY

Paradyne HO-10 and Paradyne HO-20 may be added to heating oil at any point in the distribution system—at the refinery, bulk plant or at the local terminal.

EASY EVALUATION OF EFFECTIVENESS

It's easy to determine which and how much new Paradyne HO additive to use by simple ASTM pour determinations:

1. Test the response of heating oils to both additives.
2. Evaluate heating oil responses over a range of additive concentrations.
3. Vary proportions of various stocks to be blended in the finished fuel. Generally, to effect maximum savings, evaluate the effect of high-pour components on blends.

COMPOSITION AND APPEARANCE

Both Paradyne HO-10 and Paradyne HO-20 are approximately 50% concentrates of active ingredient in kerosene. Both are liquids at room temperature.

EASY TO STORE AND HANDLE!

For further information write to 15 West 51st Street, New York 19, New York.

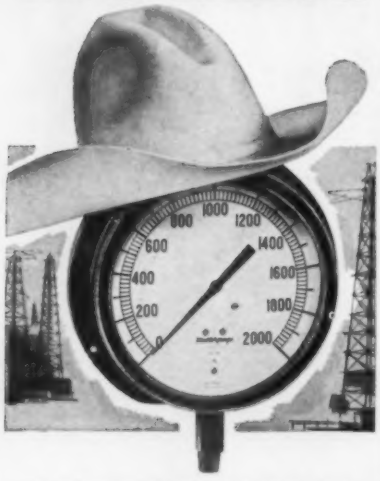
ENJAY CHEMICAL COMPANY

A DIVISION OF HUMBLE OIL & REFINING COMPANY

ENJAY ADDITIVES

EXCITING NEW PRODUCTS THROUGH PETROCHEMISTRY

OIL KING



Acknowledged so by oil men who have used all kinds of gauges

The ten-gallon hat on the Marsh Mastergauge is worn as a crown of acceptance, an emblem of excellence . . . well earned through years of rugged oil country service.

Just as kings ascend thrones through lineage, the Mastergauge was destined for "royal" acclaim the day it hit the drafting board. Because every product born at Marsh is "born to the purple."

For what other gauge has the Marsh heritage of functional design innovations? Only Marsh offers Conoweld construction, the Marshalloy case, "coined" sector Mastergauge movement, "Recalibrator" adjustment, and optional Safecase protection plus.

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commercially. Since armor cable should under no circumstances be used in more-hazardous areas (those classified as Division I by the American Petroleum Institute), a changeover from armor cable to conduit and wire is required when the installation passes from a Division II (less-hazardous) area into a Division I area. Great care is needed here to perform a satisfactory splicing, with "compound-filled" safety connectors.

It would be highly desirable for one of the petroleum committees of one of the engineering societies to standardize on a color code for voltage level of jacketed cables, the engineers recommended.

What's New / IN PROCESSING

A waste-water treatment process developed by Sun Oil Co. will be made available to refineries as part of Universal Oil Products Co.'s package of water-pollution control programs. Sun recently announced that UOP would handle licensing arrangements for its new Water Management process.

The process permits reuse of certain refinery waste-water streams as makeup water in cooling towers. Through biological oxidation within the tower, concentration of phenols and related chemicals are greatly reduced. The process also solves a water disposal problem, since the phenol content of waste water discharged into streams or public sewers is limited by law in many states.

The Water Management process is being used at Sun's Toledo (Ohio) refinery, where it reduces phenol content 99.9% without creating objectionable odors, the company reports.

•

New facilities for increased production of anhydrous ammonia have been completed at Texaco's Lockport (Ill.) plant.

Capacity has been raised from the original design capacity of 180 tons of ammonia per operating day to 220 tons per day.

The new facilities will be in full operation before the height of the 1961 fertilizer season, Texaco says, to service customers in the Middle West.

•

Propylene carbonate is now being produced in commercial quantities by Dow Chemical Co.'s Texas Division, at Freeport. Up to this time, the material was being produced there only in pilot-plant quantities.

Propylene carbonate is used as a natural gas purification aid, a specialty solvent, and a chemical intermediate. Its chemical properties closely resemble those of ethylene carbonate.

•

Construction of Shell Oil Co. of Canada's 20,000 b/d refinery, at Trafalgar, Ont., will begin within the next few months. It is expected to be on stream by 1963. The cost of construction has been estimated at $25-million.

•

Catlytic Construction Co. has been selected to perform maintenance services at an ammonia-urea plant now being built by Solar Nitrogen Chemicals, Inc., at Atlas, Mo. The plant will be operated for Solar by Atlas Powder Co. (PW—Nov.11 '60,p84). Solar is jointly owned by Atlas and Standard Oil Co. (Ohio).

The Solar contract is Catalytic's 23rd for continuous contract maintenance.

•

Ethyl Corp. and Catalysts & Chemicals, Inc., have entered into an agreement to cooperate in the research, development, and testing of catalysts for use in catalytic converters for automobile exhaust gas.

Ethyl has conducted extensive research in this field for the past several years. Its cooperative program with Catalysts & Chemicals will aim at developing a commercially practical catalyst.

•

The first independent refinery in Florida will be built by Florida Southern Oil Co., a newly formed subsidiary of Frontier Oil Co., Cheyenne, Wyo.

The company has exercised its option to buy a 100-acre tract at Drummond Point, east of Jacksonville. The facilities are expected to be completed within three years, and will include a $1-million deepwater terminal.

NOBODY OFFERS MORE CATALYST KNOW-HOW

To bridge the gap between selection of a catalyst and getting the most usefulness from it, HOUDRY offers you a background of more than 30 years' intensive experience in process design and operation—along with basic experience and proved capability in catalyst design and manufacture.

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Think about it, then call us.

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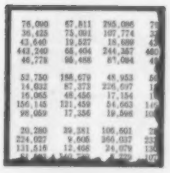
The Market  Trend

PETROLEUM WEEK

March 10, 1961

It Looks as if the Winter is History

A barging company president said last week, "Nobody loves me any more." However, he quickly added, "But they sure did when it was cold." That is, when they needed deliveries.

In other words, the pressure is off the heating oil market. Of course, everybody could be wrong again, as they were in last year's exceptionally cold month of March. But it looks as if the winter is over.

Prices for distillates, recently so firm, are being shaded in many areas of the nation. Balmy weather drove the buyers out of the market.

Chicago was the first big area to feel the sell-off. Prices for No. 1 and No. 2 fuel oils fell 0.25¢, to 10.75¢ and 10¢, respectively. In actual practice, some of the recent No. 2 truck-lot advances to 10.25¢ lasted only a short time before discounts crept in.

The reductions in Chicago quickly fanned out over Wisconsin, Illinois, and Indiana. Terminal prices fell 0.25¢ at Madison, Wis., and at Amboy, Franklin Park, Lemont, and North Pekin, Ill.

The downtrend was picked up in the Mid-Continent, too. A Kansas refiner cut No. 1 fuel by 0.25¢, to 10.5¢. Oklahoma prices softened for kerosine and diesel fuel.

Immune to the weakening so far have been the Gulf Coast and the East Coast. There have been no outright posted reductions in either area. At the Gulf, No. 2 fuel still is asked at 9.5¢ a gal., but spot sales have fallen away to nothing. At New York harbor, the posted 10.65¢ barge price for No. 2 fuel is being shaded by 0.1¢ to 0.2¢ a gal.

But tanker rates are heading downward, and this eventually will soften up the East. Rates broke wide open last week. One clean vessel was fixed at $3.99 a ton ("plus 40%"). The next one was $1.14 a ton lower, at $2.85, the "flat rate."

All in all, this may turn out to be the prayingest season on record. First the refiners prayed for cold weather because fuel oil stocks were building too fast. Then they prayed for warm weather in January. They still might be praying for more cold weather before April.

Gasoline: Weak At the Edges:

Don't be too surprised if gasoline prices take a small header in the Upper Midwest. It's quite easy now to get 0.5¢ discount.

The Gulf Coast looks teetery, too. A trader remarked on the dearth of gasoline selling. When the next sale comes, he adds, it will look "pretty sick."

Military 'Gas':

A possible indication of sentiment on the Gulf was the bidding last week to supply a cargo of combat gasoline to the military. The lowest price was 10¢ a gal. for 83/91 octane. This compares with a posted 11¢ for 90.

The Market Place

AROUND THE WORLD

Current key crude and product prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service, a McGraw-Hill Publication.

All prices as of March 6

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem....12.25-13.25
- Gasoline, 92 oct reg....11.25-11.5
- Kerosine....10.25-10.75
- Heating oil, No. 2....9.5-10
- Gas oil, 48-52, d.i....9.75
- Fuel oil, bunker "C"....$2.30-2.40

Caribbean, cargoes
- Avgas, Grade 100/130....14.75
- Gasoline, 93 oct research prem....10.875
- Gasoline, 87 oct research reg....9.5
- Gasoline, 80 oct research....8.75
- Gasoline, 70-72 oct motor method....8.625
- Kerosine....9.875
- Heating oil, No. 2....8.625
- Gas oil, 48-52 d.i....8.875
- Fuel oil, bunker "C"....$2.00

New York Harbor, barges
- Kerosine....11.65-11.9
- Heating oil, No. 2....10.65-10.9
- Fuel oil, No. 6....$2.62

Okla.-Group 3, northern shpt., bulk
- Gasoline, 91 oct reg....12.5-13.25
- **Kerosine....10.625↓-11**
- Heating oil, No. 2....9.25-9.75
- Fuel oil, No. 6....$1.80-1.90

Chicago, bulk
- Gasoline, 92 oct reg....12.375-12.625
- **Heating oil, No. 2....10↓-11.85**
- Fuel oil, No. 6 high sulfur....7.65

Los Angeles, rack
- **Gasoline, 88 oct reg....11↓-12.65**
- Diesel fuel, PS 200....7.75-11.25
- Light fuel, PS 300....$2.90
- Heavy fuel, PS 400....$2.10-2.45

Natural Gasoline, Grade 26-70
- FOB Group 3....4.5
- FOB Breckenridge, Tex....4

LP-Gas
- Propane, Oklahoma (Group 3)....4.5-5
- Propane, Baton Rouge....5.875

Pennsylvania Lubes
- Bright stock, 25 p.t....26
- 200 vis. neutral, 25 p.t....28

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i....26-27
- Neutral solvent, 200-210 vis....23-24

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i....26-27
- Neutral, solvent, 200 vis....23-24

Eastern Hemisphere

Singapore (Pulau Bukom) cargoes
- Avgas, grade 100/130....15.5
- Gasoline, 79 oct research....9
- Kerosine....9.75
- Gas oil, 48 d.i. minimum....9

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, (Okla.-Kan.), 36.0-36.9....$2.69-2.97
- North Dakota, 36.0-36.9....2.47-2.87
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9....3.50
  - Gulf Coast, Upper & Lower, 26.0-26.9....2.92-3.22
  - West Texas, sweet, 36.0-36.9....3.00
  - West Texas, N.M., inter., 36.0-36.9....2.93
  - West Texas, N.M., sour, 32.0-32.9....2.71
  - East Texas, flat....3.05-3.25
  - Mirando, 28.0-28.9....2.96-3.31
- Illinois Basin, flat....3.00
- Pennsylvania Grade, Bradford dist., flat....4.80
- California, Signal Hill, 21.0-21.9....2.33†
- North Louisiana-Arkansas, 36.0-36.9....2.72-3.02
- Wyoming, sweet, 36.0-36.9....2.85-2.90
- Wyoming, sour, 32.0-32.9....2.63-2.71

Canada (flat prices, at the well)
- Pembina (Alta.)....$2.38
- Leduc-Woodbend (Alta.)....2.53
- Redwater (Alta.)....2.42
- Steelman A (Sask.)....2.425
- Virden (Man.)....2.285

Venezuela (Cargoes, FOB lifting port designated)
- San Joaquin, 41.0-41.9, Puerto la Cruz....$3.10
- Oficina, 35.0-35.9, Puerto la Cruz....2.80
- Tia Juana, Medium, 26.0-26.9, Amuay....2.30
- Bachaquero, flat, La Salina....1.85
- Lagomar, 31-31.9, Cardon....2.55
- Lagunillas Heavy, flat, La Salina....2.07

†Differential per deg. of grav. varies

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura....$1.80
- Safaniya, 27.0-27.9, Ras Tanura....1.47
- Iran, 34.0-34.9, Bandar Mashur....1.78
- Iran, 34.0-34.9, Abadan....1.73
- Iraq, 35.0-35.9, Fao....1.72
- Kuwait, 31.0-31.9, Mina-al-Ahmadi....1.59
- Qatar, 41.0-41.9, Umm Said....1.95
- N. Zone, Burghan, 23.5-24.4, Mina Saud....1.48
- N. Zone, Ratawi, 23.5-24.4, Mina Saud....1.41
- N. Zone, Eocene, 16.5-17.4, Mina Saud....1.28

Middle East, Eastern Mediterranean
- Arabia, 34.0-34.9, Sidon....$2.17
- Iraq, 36.0-36.9, Tripoli, Banias....2.21

North Africa, Phillipeville, Algeria
- Hassi Messaoud, 48 and above....$2.65

KEY TANKER RATES

(Last paid, per long ton, single voyage)

U.S. Gulf-New York, clean....(ATRS flat) $2.85↓
U.S. Gulf-New York, dirty (ATRS + 37½%) $3.92↓
NWI-USNH, dirty....(ATRS—60%) $1.10
NWI-UK/Cont., dirty....(Scale—62½%) 12/3*↓
Pers. Gulf-UK/Cont., dirty (Scale—52½%) 29/6*↓
Persian Gulf-USNH, dirty....(USMC—65%) $4.45

**Sterling*

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Every minute that it's working, the Mission Piston is working for you. Working to cut your pumping costs, working to cut your downtime. Here's why: These bodies are lightweight, one-piece *forgings;* yet they're strong enough to resist extremely high pump pressures. The special fabric backing of the rubber compounds provides just the right degree of reinforcement for maximum piston rubber life.

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6. New contoured grille and restyled sheet metal with sloping hood give you a new look, king-size visibility.

7. Seven regular models with GVW ratings from 4,200 to 8,800 lbs. – plus the special new model C-100 – present a complete light-duty line-up.

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International Harvester Company, Chicago • Motor Trucks • Crawler Tractors
Construction Equipment • McCormick® Farm Equipment and Farmall® Tractors

Common Market Blue Over 'Red' Oil

(A report from PETROLEUM WEEK'S *Brussels correspondent)*

BRUSSELS—Fears of a flood of Italian products refined from Soviet crude have led a Common Market committee to question member nations on legal conditions regulating oil imports.

A questionnaire has been prepared by a special experts' committee of the European Economic Community, for the governments of France, Germany, Italy, Belgium, the Netherlands, and Luxembourg.

The questionnaire is the third to be prepared by the committee.

The first two dealt with import volume and prices, and with investments in refineries and petrochemical plants.

Italy is already using the Common Market principle of freedom of internal movement to sell products made from Soviet crude in Germany and the Benelux countries (Belgium, the Netherlands and Luxembourg).

With a large excess of refining capacity over domestic demand, Italy insists on buying oil at the cheapest possible source. It has thus refused to impose quotas on Russian oil.

Under a just-completed trade agreement, Italy will import 4-million tons of Russian crude during 1961. Not only will this oil be used by the state-owned ENI group, but also by private refiners (PW—Mar.3'61,p38).

One fear in the Common Market organization is that member nations may limit movement of all oil across their frontiers no matter what the original source.

This may legally be done by member countries under a safeguard clause in the Treaty of Rome, which established the Common Market.

Unilateral moves such as this by member governments, however, would grievously wound the Common Market idea—the elimination of as many restrictions as possible on trade among members.

There is a trend in opinion toward a move by the Common Market organization itself to impose restrictions on imports from Communist-bloc nations.

Germany and the Benelux countries are believed to be in favor of such a move. Italy would most likely be opposed to it.

But the Common Market organization does not now have power to enforce any such plan.

The Rome Treaty is at present in a transitional stage. It's thought that neither the Common Market Commission nor its Ministerial Council would be able to impose import restrictions on member governments.

Alternatively, France may propose national restrictions similar to its own. So far, it is the only Common Market nation regulating product imports.

France requires that all imported oil products be certified as to the origin of the crude from which they were refined.

The French move, if accepted, would be a temporizing one. France is producing large quantities of Sahara oil itself and apparently hopes that restrictions on Russian imports can be tied in with measures to protect its own oil in the six-nation Common Market.

The Common Market experts have been given strong support in their fears of Russian oil by a secret document of the North Atlantic Treaty Organization.

NATO, charged with the military defense of Western Europe, is reportedly concerned about the strategic effects of a too-great reliance by Europe on Eastern-bloc oil.

Castro: 'Oil Crisis Resolved'

HAVANA—Prime Minister Fidel Castro claims his government has resolved Cuba's "petroleum crisis," thereby defeating the "imperialist, monopolist oil trust."

If maintaining a costly tanker-bridge from the Black Sea to Cuba is "resolving," Castro has done it, as some observers see it—by importing Russian products to make up for the reduced output of refineries seized from major oil companies last summer, and Russian crude to feed those refineries.

But the fact remains, they note, that Cuba has rated refining capacity of nearly 90,000 b/d and consumption under 70,000 b/d, with no export markets left.

Despite government reassurances, evidence in Cuba points to continuing operating trouble with the confiscated refineries, now totally dependent on Russian crude for which they were not designed.

The refineries—the Texaco plant in Santiago, and the Esso and Shell units in Havana—formerly processed Venezuelan crudes.

Since the takeover, all three have been shut down, on and off, for varying periods.

One reason—besides difficulty with Russian crudes—is lack of catalysts. Another is difficulty in getting spare parts—a problem Cuba has been unable to resolve.

Further, the quality of crude delivered by the Russians is highly variable. One result is imbalance of product output—and surpluses that have periodically forced refinery shutdowns due to lack of storage facilities.

For example, it is known that the gasoline yield is poor in both volume and quality.

Even so, a mounting surplus of very-low-octane gasoline has been produced as a result of efforts to meet needs for fuel oil (which, nonetheless, accounted for most of product imports from the Soviet Union last year). Now the government reportedly may try to export the surplus gasoline.

The government says Cuba's product consumption gained across the board last year while crude imports dropped.

An announcement by its oil agency, the Cuban Petroleum Institute, said the consumption increase ranged from 2.4% for fuel oil to 20.6% for liquefied petroleum gas.

The Institute also said crude imports dropped to 68,300 b/d in 1960 —from 72,600 b/d in 1959—but will rise to an estimated 90,000 b/d this year.

According to published reports of Soviet oil deliveries, Russian crude accounted for approximately ⅓ of total 1960 crude imports. Soviet deliveries —including roughly 2½-million bbl. of products—were started last April and stepped up sharply in July following seizure of the refineries.

With the major oil companies squeezed out, exports of refined products dropped 80%, from 14,500 b/d in 1959 to an average of 3,200 b/d for 1960.

Bechtel Completes

NORWAY'S FIRST MAJOR REFINERY

Another grass roots refinery—this one in Norway—has been added to the string completed by Bechtel. Designed to meet the rapidly increasing demand for Esso petroleum products in Scandinavian countries, it is located at Slagen, near Tonsberg, Norway. The project was built on schedule and under the budget.

The new 42,200 barrels-per-day refinery—a hydroskimming type designed by Esso Research and Engineering Company—is owned by A/S Esso-Raffineriet, Norge, a subsidiary of Standard Oil Company of New Jersey.

Bechtel supervised engineering and procurement. Construction was performed by Bechtel in a joint venture through the medium of A/S Bechtel-Sverdrup Norge.

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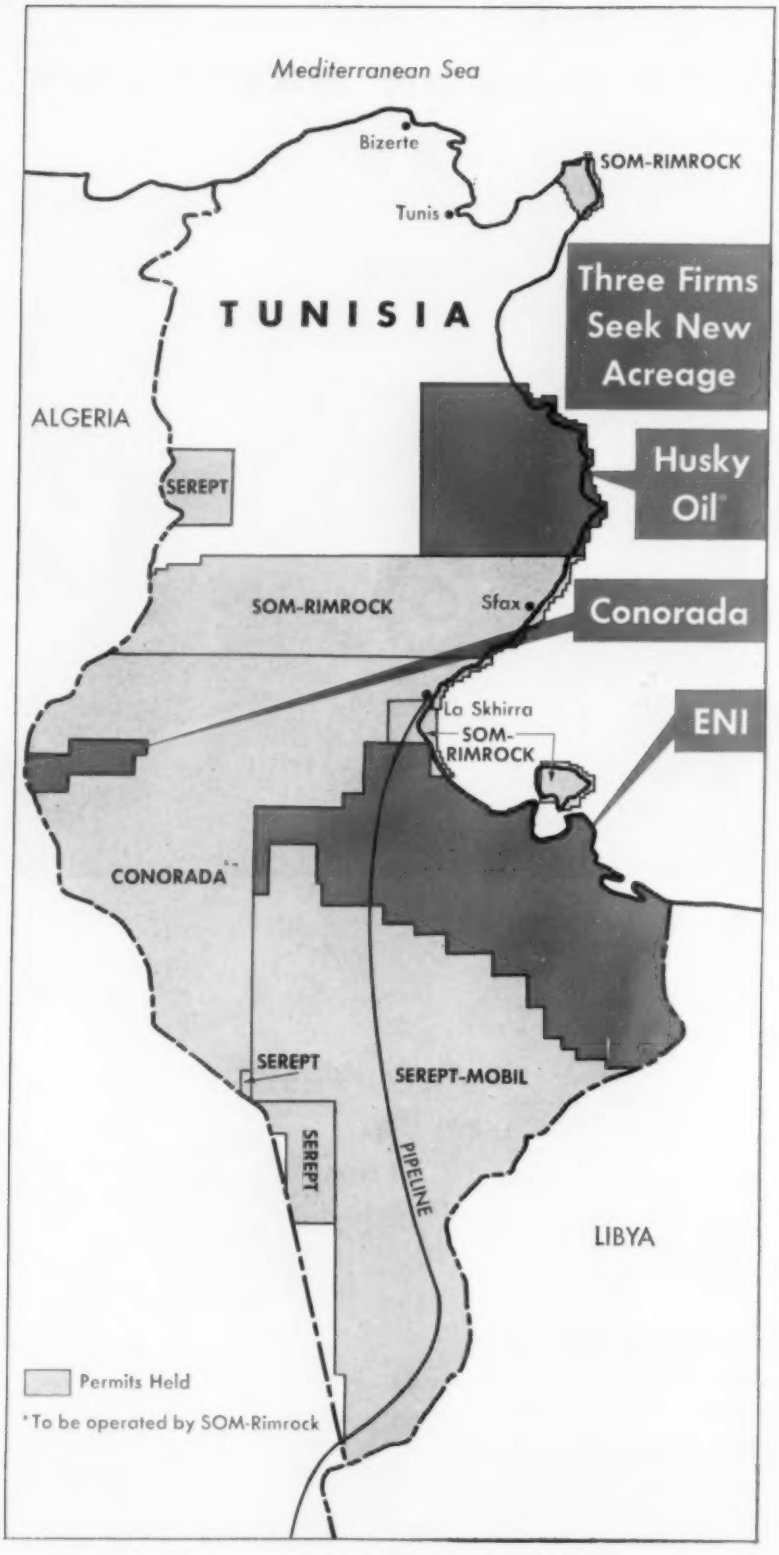
New Interest Shown in Tunisia Search



Tunisian exploration, long in the doldrums, seems headed for an upsurge, with three companies seeking large permits.

The hunt for oil in Tunisia slowed down late in 1959 after some 35 dry wildcats had been drilled by the joint French-Tunisian company Serept. At that time, Serept abandoned its last wildcat and sold its rig.

Since early 1960, activity has been confined to surface exploration.

Two U.S. firms have been given preliminary approval by Tunisia to increase their exploration acreage.

Conorada, representing Amerada Petroleum, Continental Oil, and Ohio Oil, has asked for an 800-sq. mi. permit that will be added to its existing permit and bear the same expiration date, May 9, 1963.

Husky Oil, of Cody, Wyo., wants rights to a 6,200-sq. mi. onshore and offshore tract along the Gulf of Gabes, in east-central Tunisia.

While Husky does not hold any acreage in Tunisia under its own name, an affiliate, SOM Rimrock, has rights to 3.9-million acres. SOM Rimrock is the Italian subsidiary of Rimrock Tidelands, Inc., in which Husky holds a 50.23% interest. SOM Rimrock will be the operator on the new permit.

The other firm seeking exploration acreage is the Italian state-owned ENI, which reportedly has picked out a large tract in south-central Tunisia, with government approval.

The actual location and size of the ENI tract has not yet been announced, but it was indicated the company was eyeing 12,000 sq. mi. just north of the joint Serept-Mobil permit.

Dry wildcats have been drilled by the previous permit holder on two of the three permits being sought.

Serept, which once had rights to the whole of Tunisia, drilled at least six tests on the proposed Husky Oil permit and eight on the acreage ENI apparently is seeking.

Meanwhile, ENI, implementing its 1960 agreement with Tunisia, is looking for a refining site, and is building its first service station in Tunis.

ENI reportedly has abandoned La Skhirra, outlet for a 24-in. Algerian pipeline, as a possible refinery site, probably in favor of either Bizerte or Sfax (map).

The Italian firm also has just completed an agreement with a local marketer, Soc. Batiment, under which the latter will distribute ENI's gasoline.

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German Demand Passing Plant Growth

BONN—West Germany's demand may outpace its refining capacity by 1965, even with another 33% addition to capacity, according to a new forecast issued jointly by oil companies in Hamburg.

Present refining capacity is 810,000 b/d—three times what it was three years ago. The increase in 1960 alone was 34.5%, with 210,000 b/d added by three new plants and expansion of four others.

Plans call for a further increase to some 1,080,000 b/d by 1965, equivalent to estimates of demand at that time.

The new forecast emphasizes, however, that this demand estimate is conservative. It predicts that oil will account for 30% of Germany's energy supply in 1965—up from 22% in 1960—with growing industrial production increasing total energy demand 4.5% annually.

Imports of some 160,000 b/d of refined products would still be required in 1965 if refining capacity is expanded to 1,080,000 b/d, the forecast says.

This prediction is based on an average 85% utilization of refining capacity.

Thus, the report concludes, anxiety that German refinery expansion is running far ahead of demand is unfounded.

Crude runs this year are expected to increase to 700,000 b/d, with refinery output up 23% over 1960.

According to another forecast—by AEV, the German producers and refiners association—this will also still leave a gap for imports of products.

It estimates Germany's own 1961 oil demand at 660,000 b/d (excluding refinery consumption) and probable exports over 40,000 b/d.

AEV's forecast is based on a detailed breakdown of the planned crude runs of its members, by plant and source of supply. The detailed figures total 660,000 b/d, but AEV's 700,000 b/d estimate allows for two 28,000 b/d refineries not included: Mobil's Bremen plant (which processes Middle East crude and some from North Africa), and Frisia's Emden unit (which uses Neutral Zone crude).

German crude will account for nearly 125,000 b/d of the crude runs, while imports will increase roughly 24% over the 1960 total of 466,000 b/d to approximately 575,000 b/d.

A notable shift in imported crude supply sources this year is to the Algerian Sahara: Its share of the growing market will double this year to 4%—apparently at the expense of the Middle East, which supplied 80% of Germany's imported crude in 1960.

German Crude Imports: Five-Year Change

(Approximately, in barrels per day)

Origin	1960	1956
Saudi Arabia	123,000	59,800
Iran	108,300	2,900
Iraq	89,700	46,000
Venezuela	47,400	17,800
Kuwait	30,500	28,300
Bahrain, Qatar	21,500	100
Soviet Union	21,200	—
Colombia	9,400	—
Algeria	8,000	—
Borneo	4,100	—
Indonesia	2,200	—
Brazil	300	—
United States	—	2,800
Mexico	—	2,200
Total	465,600	159,900

In volume, Sahara crude will account for at least 22,400 b/d this year, up from 8,000 b/d, which was just under 2% of 1960 imports.

Imports of Middle East crude last year totaled some 373,000 b/d, and will increase this year to at least 413,000 b/d, according to AEV's breakdown. This would represent a drop to 77% of total imports.

Crude from South America will retain a 12% share of this year's market—but Venezuela will have only a minor share in the volume increase.

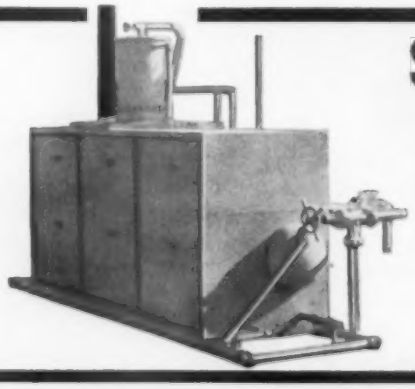
This year's planned imports of Venezuelan crude are listed at 48,400 b/d by AEV—only 1,000 b/d over 1960. Another 20,500 b/d is listed for South America without breakdown. Last year's other South American imports, totaling 9,700 b/d, came from Colombia and Brazil.

Crude from the Far East also will retain its 1960 percentage share—1.3%—with volume increasing to 7,500 b/d, from 6,200 b/d in 1960.

Germany's crude imports have nearly tripled over the past five years and the number of sources increased, too. Saudi Arabia maintained first place as supplier and Venezuela fourth, while the U.S. and Mexico dropped out (table).

According to import figures of Germany's Federal Bureau of Statistics, Iran climbed to second place in 1960, from fifth in 1956. Kuwait dropped to fifth from third, while Iraq slipped back one peg to third spot.

Last year's increase in sources of crude is equally marked by comparison with 1959 figures. These show nine countries supplying a total of 335,000 b/d. The order, by volume: Saudi Arabia, Iraq, Iran, Venezuela, Kuwait, Soviet Union, Indonesia, Algeria, and France.



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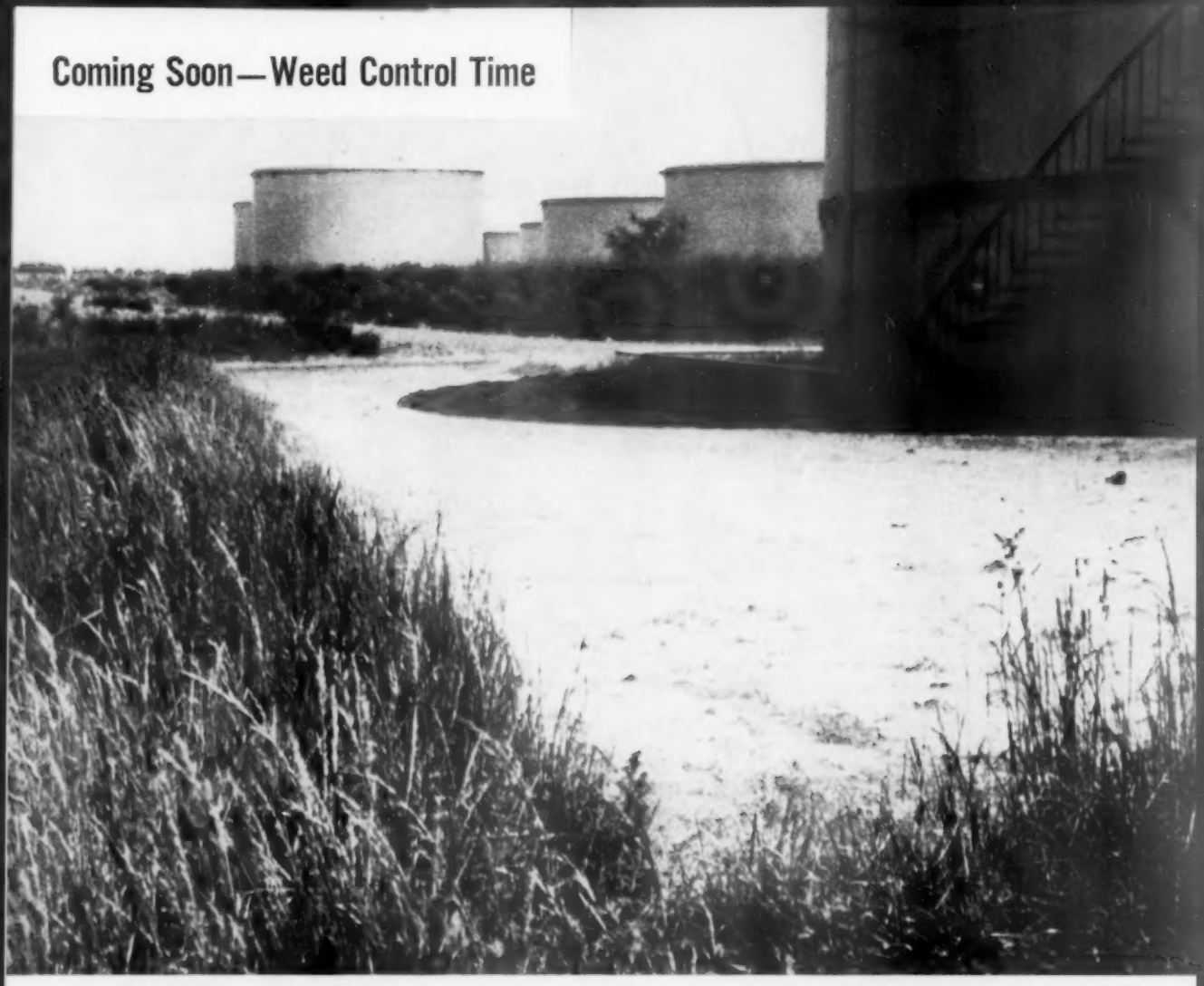

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What's New / AROUND THE WORLD

BELGIUM—Signal Oil & Gas Co. has reportedly made a two-year deal for processing of 8,000 b/d of its Venezuelan crude at Antwerp in a 25,000 b/d refinery owned by the independent Raffinerie Belge de Petroles. Signal's Los Angeles headquarters last week would neither confirm nor deny the report. The company is currently producing a gross 23,000 b/d from a Lake Maracaibo concession in which it has a 50% interest. It also has stakes in Middle East production.

•

ARGENTINA—The Economy Minister sees Argentina's imminent self-sufficiency in oil extending only until 1965, when it will again become an importer due to industrial growth. The Minister, Alvaro Alsogaray, also said last week that, although the state oil agency faces a substantial deficit this year, this "difficult situation" will in no way affect payments to the foreign and local companies it has under contract.

•

LIBYA—Esso Sirte has abandoned a long stepout from its 3,000 b/d Raguba discovery in Block 20 and is preparing to test another stepout.

The No. 2 Raguba, some 8 mi. north of the discovery, was drilled to 6,562 ft. before it was plugged. Completion tests are expected soon on the No. 3 Raguba, 3 mi. east of the discovery. Esso Sirte is associated with Texas Gulf Producing Co. and W. R. Grace Co. on the tract.

•

LIBYA—Union Oil Co. of California reports it has a 20% interest in a joint venture that is seeking concessions here. "Several other companies" are also involved, Union said in its annual report.

Union said geological studies are now under way "to evaluate acreage that may be available in the near future."

•

TURKEY—Gulf Oil will soon spud a wildcat in Oil District 7, where exploration interest has intensified since Mobil's Bulgurdag discovery last summer (PW—Jul.29'60,p40).

The government company, Turkish Petroleum, recently spudded its No. 1 Arabali test in the same district, in south-central Turkey.

•

KUWAIT—Rising demand for LP-gas in Lebanon and Jordan may be met by supplies from Kuwait—delivered overland in bulk by Lebanese and Kuwaiti business interests.

Tests will start this month on economic and technical feasibility of truck-trailer haulage of compressed LPG more than 800 mi. across the Arabian desert. If successful, the group plans to order a fleet of vehicles and to distribute bottled LPG from Beirut and Amman. Present supplies are partly imported from Italy.

•

LEBANON—The German producing company that started wildcatting last summer is giving up after two dry holes and terminating all exploration, it announced last week.

Only one other wildcat had ever been drilled in Lebanon before Gewerkschaft Elwerath drilled one test in the northeast and a second in the south. Elwerath, which is owned in part by Esso and Shell, acquired a 50% interest in the Lebanese-owned Cie. Libanaise des Petroles in 1959 and agreed to drill two wildcats by the end of 1961.

•

ADEN—British Petroleum will raise the capacity of its refinery here from 110,000 b/d to 136,000 b/d at a cost of $1,540,000. The work, expected to be completed by the end of 1961, will involve modification of and additions to existing units.

•

AUSTRALIA—Indiana Standard is assured of Queensland's "good offices" in setting up its own marketing outlets for its projected 15,000 b/d refinery at Brisbane (PW—Feb.10 '61,p39).

The state government also agreed to buy all its requirements, except asphalt, from Indiana's new Amoco Australia Ltd. for ten years, according to terms reported from Brisbane last week.

The plant is to go on stream "not later than" the end of 1966.

•

EGYPT—Capacity of the 6,000 b/d state-controlled refinery at Mex will be boosted to 26,000 b/d by the end of the year. Caltex has a 14% interest in the plant, where a new 20,000 b/d unit supplied by the Soviet Union is currently being installed. The $5.6-million cost will be repaid with a 2½% interest in 12 annual instalments starting one year after the unit goes on stream.

•

IRAN—Crude production remained well over 1-million b/d in January, averaging 1,115,000 b/d compared with 993,000 b/d in January 1959 and a high of 1,202,000 b/d last October.

•

ABU DHABI—With four offshore producers completed, a joint British-French company is developing an export system at its Persian Gulf island base.

Abu Dhabi Marine Areas, Ltd., two-thirds owned by British Petroleum and one-third by Cie. Francaise des Petroles, has chosen a contractor to build an 18-in., 20-mi. pipeline from Umm Shaif Field to Das Island, the export terminal site.

Salman Puts Up 'Hands Off' Sign

IRAQ—Oil Minister Mohammed Salman is taking steps to see that experienced Iraqi personnel with oil company jobs don't resign them for government work.

He has asked all ministries and autonomous departments not to appoint such persons without his ministry's prior approval. Asking cooperation in this "vital matter," his circular said:

"Encouragement of Iraqis who have acquired sufficient experience during the years of their work with the oil companies to give up these jobs is harmful to plans of the Iraqi Revolutionary Government aiming at accelerating the Iraqization of posts in the oil companies."

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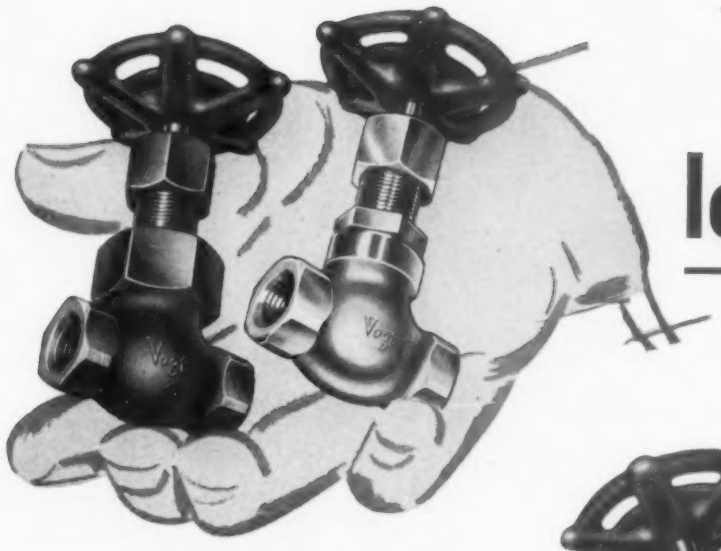

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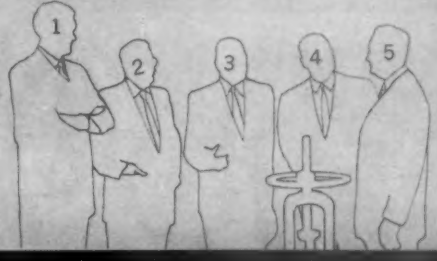

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A more comprehensive, quicker picture of the industry's economic shape is yours through all the revisions made on this page. When did runs peak this year? What was the spread between 1961-1960 demand the second week in January? You won't have to waste precious time leafing through statistical tomes any more—you'll have the answers at a glance in your latest issue of PETROLEUM WEEK. The continuous line on each chart shows daily averages for each week of 1960. The vertical lines show the latest week of 1961. All figures are daily averages calculated on a weekly basis except for industry inventories.

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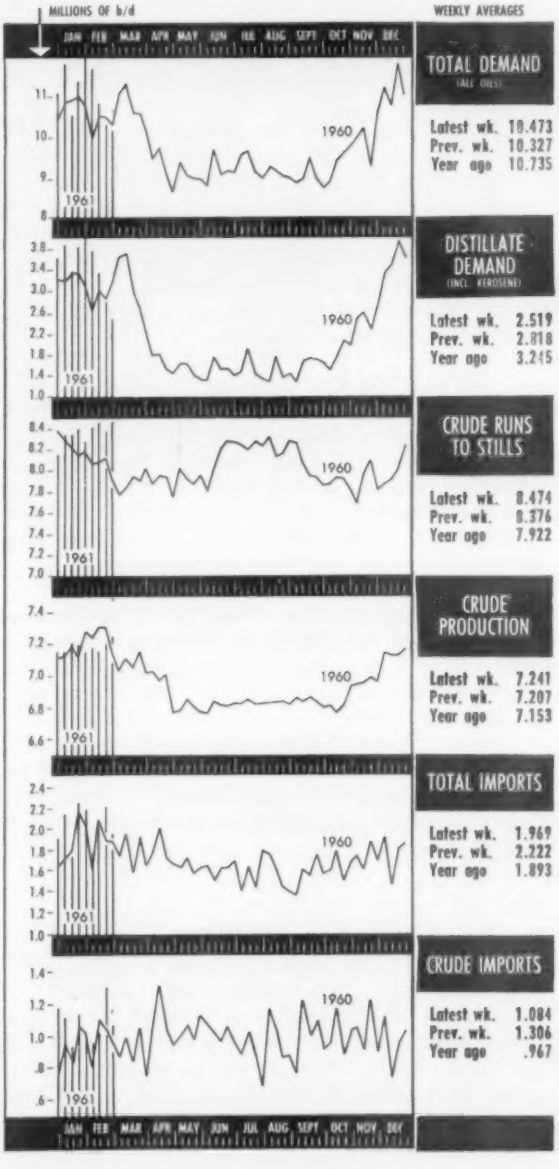

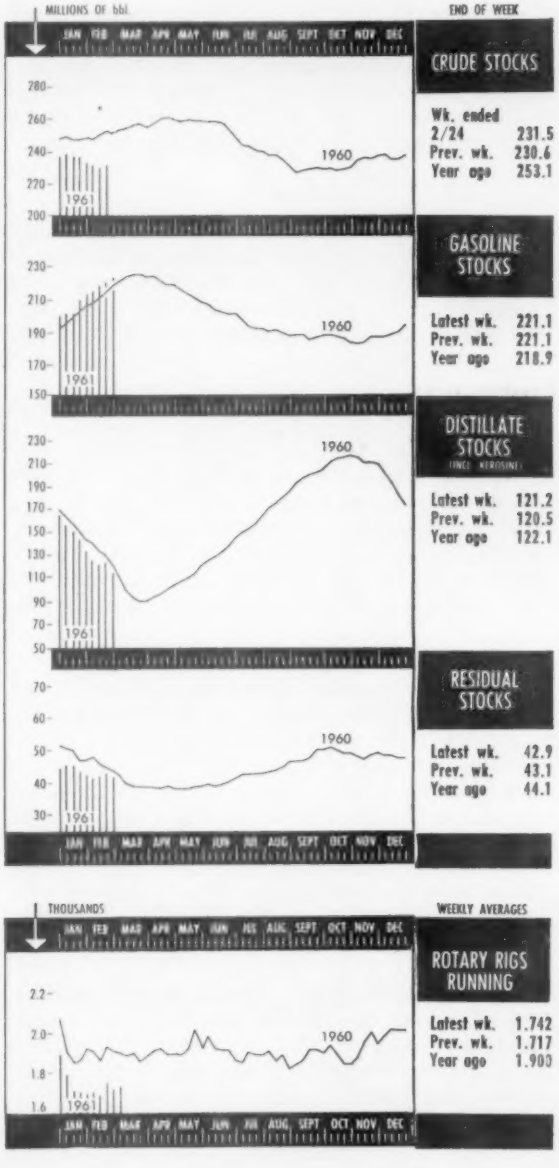

Company Developments

Studebaker-Packard Corp. has made its first diversification move into the additives field for motor oil and fuels. The company has purchased Chemical Compounds, Inc., St. Joseph, Mo., for cash plus contingent payments out of future earnings of the business. The company processes and distributes additives, and its principal product is STP, a motor oil additive.

•

Zapata Off-Shore Co., Houston, has acquired a substantial stock position in National Tube Coating, Inc., Beaumont, Tex. National has developed a process for plastic coating the interior of tubular goods used in the drilling and completion of oil and gas wells to combat corrosion.

•

Rising costs were cited this week by Enjay Chemical Co. in boosting the price of its line of petroleum additives by 5%. Manufacturing costs have increased, technical service costs have doubled during the past five years, and sales service and new product development costs have more than doubled, Enjay said.

•

Cal-Metal Pipe Corp. of Louisiana will now be known as Stupp Corp. The Baton Rouge pipe mill will be operated as a wholly owned subsidiary of Stupp Bros. Bridge & Iron Co., St. Louis. Stock interests in the pipe company formerly held by Cal-Metal Corp., of Torrance, Calif., were bought.

Expansions

The mushrooming electronic data processing division of Minneapolis-Honeywell Regulator Co. is making plans for further expansion.

The company has purchased 48 acres in the Boston suburb of Billerica to build a 75,000-sq. ft. manufacturing plant. Work is slated to get under way by midsummer, with occupancy slated for mid-1962. The division's president, Walter W. Finke, says the building is "the beginning of a complex conceived to provide for future growth of the division.

A. O. Smith Corp. expects to start making large-diameter, heavy-wall pipe in its Milwaukee plant next August. The company's flash-welded 36-in.-diameter pipe is now available only from its Houston plant.

The company's tubular division has installed a new 3,000-ton crimping press—the second of three major equipment changes in its Milwaukee forming press line. When completed, the line will include the crimping press, an 18,000-ton closing press, a U-ing press, new feeders, unloaders, and complete rearrangement of conveyor systems.

Tretolite Co. of California, division of Petrolite Corp., has completed its new facilities at Brea at a cost of over $2-million. The plant includes a 7,500-sq. ft. administration building, three labs, and a complete, highly mechanized manufacturing section. The plant's production capacity exceeds 10,000 drums of products monthly.

Dow Chemical Co. has opened new chemicals technical service and development facilities at Freeport, Tex. Principal development work planned for the new location will be concerned with polyglycols and chlorinated solvents, items which are in volume production at the Dow Texas division facilities in Freeport. The service unit's activities are an extension of operations performed at company headquarters in Midland.

Another link in a chain of liquid mud facilities across the Texas-Louisiana Gulf Coast has been put in operation by Magnet Cove Barium Corp. at Edinburg, Tex. The new Magcobar installation consists of six 500-bbl. storage tanks and one mixing tank with a capacity of 250 bbl. It has been constructed at the site of existing warehousing and bulk dry mud storage units.

Chain Belt Co. has added a 100-metric-ton fatigue-testing machine to its Milwaukee research center. It is said to be the largest such device in the chain manufacturing and construction machinery industries.

The addition enables the company to test chains ranging from 1,000 lb. to over 1-million lb. in ultimate strength. It will be used to test heavy, larger-pitch chains, including those used on oil field equipment.

Mergers

Stockholders have O.K.'d the proposed merger of Western Hemisphere Petroleum Corp., Tulsa, and Deluxe Coils, Inc., Wabash, Ind. The surviving corporation will be known as Wabash Magnetics, Inc. Western Hemisphere owns producing oil and gas properties in the U.S., and undeveloped properties in Bolivia, Honduras, and Canada. Deluxe manufactures electrical and electronic components.

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Jobbers: Key to Phillips Expansion

Phillips Petroleum Co. has finally crossed the Potomac in force and invaded the attractive markets of the Northeast.

Last week, the company opened a new division office in Baltimore, which will supervise expansion in northern Virginia, Washington, D. C., Maryland, Delaware, the eastern two-thirds of Pennsylvania, and the southern one-third of New Jersey.

This long-awaited move climaxes Phillips' drive up the Atlantic seaboard, which began with an entry into the tourist markets of Florida in 1953. Phillips is now the third largest marketer in this state.

The campaign for Northeastern markets actually represents one prong of a two-pronged pincer attack into the East. The other Phillips drive is centered in Ohio.

Phillips is just now entering Cleveland and the counties of northeastern Ohio. Last month, Oil Enterprises, Inc., one of Phillips' jobbers in the area, broke ground for the first new Phillips station in Cuyahoga County (Cleveland).

The Ohio campaign is expected to move quickly. While other Phillips jobbers (there are 32 in Ohio) consolidate their positions within the state, F. E. Lightfritz, president of Oil Enterprise, told PETROLEUM WEEK that he intends to open 25 stations by the end of the year, Phillips is already a leading marketer in Columbus.

Eventually this buildup in Ohio can be expected to overflow into western Pennsylvania, where it will fuse with the territorial expansion of the Baltimore division.

The strategy will give Phillips an unbroken chain of stations all the way from New Jersey to Arizona.

It will place Phillips within striking distance of the two most important metropolitan markets in the country —Los Angeles and New York.

Phillips' invasion into the Northeast is unique in that the company will depend entirely upon jobbers for its expansion.

Phillips Petroleum is one of the very few major companies that relies heavily (up to 85%) on jobbers for its gasoline sales. And it frankly would like to be represented 100% by jobbers. Phillips believes jobbers provide the personal touch it desires in local markets.

THE COMPANY'S MOVE NORTH brings it within striking distance of New York.

This strategy runs head on against the direct marketing policies of other marketers. Tidewater Oil Co., for example, has relied exclusively on commission agents for its penetration into the markets of the Southeast (PW—Mar.18,'60,p88).

One of the leading marketers in the East—Humble Oil & Refining Co.—has few jobbers through which it markets gasoline. In Ohio, where new Humble ovals are being hoisted close to the new Phillips shields, Humble uses no jobbers at all.

The direct marketing approach has one overriding virtue: It escapes the devastating problem of brand switching by oil jobbers, which can cost an unlucky supplier many millions of gallons in marketing outlets.

Phillips itself has fallen victim to this problem (it lost representation to Tidewater in North Carolina), and admits there is "no defense against it."

To promote its own jobber advance, Phillips is forced to approach the jobbers of its competitors.

Fanning out from the Baltimore headquarters are scores of Phillips representatives who are calling on jobbers between Virginia and New Jersey. In a sweep through Pennsylvania, the Phillips visits have already had a costly effect on Atlantic Refining Co. With one flip of the pen, Atlantic lost 54 million gal. of annual product sales when M. D. (Dave) DeTar, president of Aero Oil Co., New Oxford, Pa., signed as a Phillips jobber. (The switch becomes effective on Apr. 1.)

DeTar had been one of Atlantic's

from terminal to pump

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See Sweet's Industrial Construction File—Section 8-B

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largest jobbers. Why did he change hands?

As DeTar tells it, Atlantic wanted to buy him out, but he wasn't ready to sell. Along came Phillips with a ten-year contract, guaranteeing him the right to continue as a jobber, and DeTar (after thinking it over) accepted.

George E. Glatfelder, Phillips' assistant sales manager, went a little further in explaining the appeal Phillips has for jobbers.

"We work closely with jobbers and we offer them a full program of assistance and training. Some companies neglect their jobbers," he said, speaking at a press conference in Baltimore last week.

And what is perhaps more important, Phillips offers jobbers profit margins that are larger than the margins they would be offered if they became commission agents, Glatfelder said.

The promotion work of the Phillips representatives in the Baltimore division may be intensified by the fact that Phillips does not plan to offer its jobbers any large, ultra-modern stations in the area. (The building of new stations will be the responsibility of the jobbers themselves.)

In contrast, Phillips' division manager in Ohio, Stanley G. Watson, has had great praise for the elaborate, canopied outlets that characterize expansion in his area. One important reason for liking them: They attract "class A dealers."

Even without these attractive stations, Phillips estimates that within three years, it will have 1,000 outlets in its Baltimore division. (The company now operates through more than 21,000 stations in 36 states.)

There are other ways in which Phillips' advance into the East will affect other marketers—even if they don't lose any jobbers.

First, Phillips does not intend to fair trade, even though it will be entering the fair-trade states of Pennsylvania and New Jersey. Although this may not spell trouble for fair-trading companies, it does represent a tacit vote against fair trade itself.

Phillips also has certain ideas of its own on other pricing issues. It will not adopt the "no-protection" policies that prevail in many states.

Marketers that invoke these policies defer from extending any price discounts to dealers and jobbers caught in local price wars.

"We plan to be competitive in our pricing," Glatfelder explained.

On the other hand, Phillips intends to respect the prevailing price differentials between majors and independents, Glatfelder said, even when the independents are, in effect, subsidiaries of major companies.

"As long as they don't have the advertising or don't offer such services as credit cards," said Glatfelder, "I believe they deserve a lower price for their products."

Phillips, of course, is a dual marketer itself. In parts of the South, certain Phillips jobbers have asked to market under a private-brand label. As a result, Phillips established an alternate program that would fit their needs.

That same alternate program will be available to jobbers in the Northeast, but Phillips would prefer not to have to offer it, Glatfelder said last week.

What's New / IN MARKETING

The once unobstrusive Hawaiian gasoline market has now found itself on the agenda of the state legislature. The state is looking for antitrust violations.

What prompted the study? Apparently a fear of monopoly. Rep. Robert Fukuda, a Republican and a former deputy attorney general, proposed the investigation because, he said, "this state has the most concentrated vertical integration of gasoline suppliers anywhere."

Fuel Oil Head Named

The "one-roof" oil heat organization may not have a name yet but it has a leader. He's Glenn L. Werly, veteran marketer for Mobil Oil Co. (PW—Jan.20 '61,p54). Most of Werly's experience is connected with service stations. In 1936, he formed his own chain of outlets.

Werly will retire from Mobil, where he is a special assistant to the marketing vice-president, to assume command of the newly emerging combination of refiners, distributors, and manufacturers that formerly held force in two separate units—the National Fueloil Council and the Oil Heat Institute of America.

Washington State motorists would save money, even if they chipped in as much as 5¢ more a gal. in gasoline taxes. This argument figures in a drive to boost gasoline taxes in the state.

It is submitted by the Assn. of Washington Cities, which calculates that a motorist's time is worth an average of 2½¢ a minute. Modern highways, says the association, reduce driving time and thus save the motorist money.

At present the state legislature is considering an increase in the tax from the present 6½¢ to 7¢ or 7½¢ a gal.

•

"I don't want to get banged down again." This is the way Rep. James Roosevelt (D., Calif.) feels about his drive to divorce TBA merchandising from major oil companies.

Late last year, the House Small Business Subcommittee failed to endorse his view of company-dealer relations concerning TBA.

However, Roosevelt told a reporter in Washington that he plans "some conferences" next month to study the situation.

•

The stagnation in octane ratings continued into February. Both regular and premium gasolines held to averages that had been reached in August, 1960.

The Ethyl Corp.'s survey showed that regular gasoline was 92.6-octane and premium was 99.3-octane.

Except for a minor fluctuation in regular, these averages have held firmly for six months.

Compared to February, 1960, regular was up 0.3-octane, but premium showed no gain. Actually, premium peaked in March, 1960, at 99.5-octane, but it fell back in April to 99.4 and in August to 99.3.

J. D. McClendon C. A. Chandler

JESS D. McCLENDON has been appointed regional manager of sales, and **CHARLES A. CHANDLER** regional manager of merchandising, for the western region, National Supply Division, Armco Steel Corp., with headquarters in Torrance, Calif. At the same time, **E. G. Krig** was named regional manager for services there. National Supply recently realigned its oilfield sales organization: Six divisions were consolidated into four regions, and eighteen districts were combined in to eight areas. The new western region, headed by **Jerry L. Evans,** regional manager, is responsible for sales in the western United States, including Alaska and Hawaii. Evans was most recently manager of the former California division, at Torrance. McClendon, who joined National Supply in 1925, has been California division sales manager since 1957, and Chandler, who joined the company in 1935, was formerly manager of the California district. Krig started with National Supply in 1946, and was most recently staff assistant to the division manager at Torrance.

THOMAS M. THAWLEY, with Pipe Line Technologists, Inc., in Houston since 1960, has been assigned to The Hague, Netherlands, as manager of the company's European operations. He succeeds **Richard S. Barfield,** who is returning to the Houston headquarters office to assume the duties of supervising engineer, design. **O. C. Mudd,** formerly chief corrosion engineer for Shell Pipe Line Corp., Houston, has accepted an assignment in Sydney, Australia, to assist **Milton E. Worlow,** manager of Australian operations for Pipe Line Technologists (Orient), S.A. At the same time, the company announced it would reduce its personnel in its South American operations because of slackening of oil activity in Venezuela. **Theodore L. Guerry,** manager of Venezuelan operations at Maracaibo, will return to the United States for reassignment in the Houston office. **Scott Hood** will temporarily be in charge of the Venezuelan operations of Pipe Technologists, C.A. **Frank E. Hangs,** formerly a senior design engineer in Houston, will assume temporary duties with the company's Canadian affiliate in Calgary.

ERNEST H. PEABODY has been elected chairman of Peabody Engineering Corp., New York, and **Eric G. Peterson** succeeds him as president. Peabody founded the company in 1920, and has been its president since then. Peterson, who has been with the company for more than 30 years, has served in positions ranging from field engineer to executive vice-president. He is a director of Peabody Engineering and of Peabody, Ltd., and president and a director of Peabody Engineering Corp. of Canada, Ltd.

W. D. MOORE has been named assistant to the sales manager for pipeline products in the protective coatings division of Pittsburgh Chemical Co., with offices in Pittsburgh. He was formerly sales representative for the division's full line of products in the Kansas City area, and before that, in Tulsa.

ROBERT E. FINNMAN has been promoted to vice-president, sales, steel pipe division, for Valley Mfg. Co., Omaha, Neb., and was elected a director of the company. He was formerly sales director of the company's steel pipe division.

R. E. Finnman C. L. Griffin

C. L. GRIFFIN, formerly general sales manager of the oil tool division of Chicago Pneumatic Tool Co., in Ft. Worth, has been named general manager of that division. He will be in charge of all phases of the division's operations, and thus will continue his close supervision of its sales activities. Before coming with Chicago Pneumatic, Griffin was vice-president in charge of sales of the Security Engineernig Division, one of the Dresser Industries. Griffin succeeds **G. A. May,** who becomes executive vice-president of Allen Mfg. Co., a Chicago Pneumatic subsidiary. **Donald N. McDonnell** is a new director of Chicago Pneumatic. He is senior vice-president of Blyth & Co., and is also a director of Halliburton Co., General Dynamics Corp., and Magnavox Co.

ELLIS E. BRANSON is the new sales representative in the tri-state area of Illinois, Kentucky, and Indiana, for Bradford Motor Works, with offices in Fairfield, Ill. He previously represented Charles N. Hough Mfg. Co., in that area.

MURRAY KRAUS has been appointed product manager for the new telemetering line of CompuDyne Corp., Hatboro, Pa. Telemetering is the method of transmitting information to a distant receiver by means of an electronic device that measures pressure, temperature, flow, and level. Kraus was formerly head of telemetering and control for the Ascop division of Electro-Mechanical Research Corp.

S. J. RUSEN, sales engineer at Ft. Morgan, Colo., for Schlumberger Well Surveying Corp., moves up to manager of that location, and **H. O. Daniels,** field engineer general at Vernal, Utah, becomes Vernal location manager. **R. D. Shay,** sales engineer at Artesia, N.M., has been transferred to Roswell, N.M., in the same capacity. **G. F. Horst,** senior sales engineer at Midland, Tex., has been transferred to Hobbs, N.M., and **P. W. Goodlett,** senior sales engineer at San Angelo, Tex., will move to Schlumberger's Tyler (Tex.) office.

WILLIAM H. JAYNES has been appointed general manager of the protective coatings division of Pittsburgh Chemical Co. He was formerly executive vice-president of Pacific Ocean Park, Inc.

A. N. CHIRICO is manager of Chicago Bridge & Iron Co.'s process division, which has been transferred from New York to Chicago. **J. C. Paccione** is staff supervisor, and **D. J. Madden** is supervisor of pilot plant and field service. **H. E. Jacoby** remains in the New York office as manager of the eastern region and export sales. He is assisted by **J. P. Kolb.** Chirico is also serving temporarily as manager of sales in the central and northwestern regions.

ELLIOT M. RICHMAN has been appointed supervisor of original equipment manufacturer sales, resale sales department, in the marketing division of Worthington Corp., Harrison, N.J. He was most recently a supervisor in Worthington's standard pump division. In his new position, he will supervise Worthington product sales to equipment manufacturers in the United States. Richman joined Worthington's Harrison division in 1948, and served in that division's research and reciprocating pump departments before transferring to the standard pump division in 1955.

E. M. Richman K. M. Zogg

KARL M. ZOGG, former staff reseach engineer with Sunray Mid-Continent Oil Co., has joined Oil Recovery Corp. as evaluation engineer at the company's division office in Tulsa. **Frank Small,** formerly project engineer at Dewey, Okla., is now project engineer for the Keas Orcoflood project, at Chanute, Kan.

WARD W. (BILL) KILLINGSWORTH, JR., has been named manager of drilling operations for Shamrock Oil & Gas Corp., Amarillo. He succeeds **Joe Richardson**, who has resigned. Killingsworth was formerly district field superintendent.

W. Killingsworth, Jr. J. O. Sanders

J. O. SANDERS, formerly assistant general manager, production, for The California Co., division of California Oil Co., has been appointed to the new position of general superintendent, production department. The new Calco organizational unit includes offshore platform construction and installation under the direction of **A. L. Smith**, supervisor; marine maintenance and mobile drilling rig engineering, headed by **F. C. Jacobs**, supervising engineer; transportation, under the direction of **C. A. Christensen**, superintendent; and aircraft operations, headed by **H. D. Stiles**, manager. **H. E. Denzler**, formerly marine maintenance supervisor for the company at Harvey, La., has been appointed assistant to the general superintendent. He will provide counsel and assistance to Sanders.

RUSELL C. BARBOUR has been appointed production manager, **JOHN L. LOFTIS, JR.**, exploration manager, and **J. CASE WILBOURN**, marketing manager of the new Southwest region of Humble Oil & Refining Co. New area managers have also been named: **William E. Dougherty**, Corpus Christi; **H. E. Potter**, Dallas; **John S. Bell**, Houston; and **James C. Posgate**, Midland.

PHILIP D. CROLL is the new manager of the editorial services division of Sun Oil Co.'s public relations department, in Philadelphia, succeeding **George J. Bauer, Jr.**, who is retiring. The responsibilities of this division have recently been expanded. Croll joined Sun's accounting department in 1936, and transferred to the public relations department in 1948, where he was in charge of editorial and economic research activities, and more recently assisted in the administration of the department.

A. H. CROWELL has been promoted to the newly created position of employee relations coordinator of Gulf Oil Corp., with offices in Houston. Crowell will advise the domestic operating departments on employee relations matters, and will be responsible to **K. E. Rotegard**, manager of Gulf's new services department in Houston, where Gulf's other domestic operations are now located. **W. B. Billock**, in Pittsburgh, will continue, however, to direct over-all policies concerning employee relations. Crowell has been manager of employee and dealer relations for Gulf's southern marketing region at Atlanta, Ga., for the past seven months, and before that held a similar position in New York.

LUIS ALCALA SUCRE has been named vice-president of Mene Grande Oil Co., Caracas, Venezuelan affiliate of Gulf Oil Corp. He succeeds **W. W. Adams**, who has been named to a new post with Gulf in Houston. Alcala Sucre, a native of Venezuela, has been assistant to the vice-president of Mene Grande since June, 1956, and a director since April, 1958. He joined Mene Grande in 1937.

L. Alcala Sucre G. Rodriguez Eraso

GUILLERMO RODRIGUEZ ERASO has been elected to the board of Creole Petroleum Corp., Caracas, the Venezuelan affiliate of Standard Oil Co. (N.J.) Rodriguez-Eraso, a native of Venezuela, was formerly special assistant to the president. He joined Creole in 1945, and has held various positions within the company, including that of assistant manager of the economics department. From 1955 to 1956, he worked with the producing coordination department of Jersey Standard, in New York.

RAY GRANLUND has been named manager of supply and distribution east of the Rockies for Signal Oil &

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Gas Co., with headquarters in Houston.

EARL M. KIPP took office last week as 1961 president of the Society of Petroleum Engineers, American Institute of Mining, Metallurgical & Petroleum Engineers in St. Louis. He is special consultant for producing problems on the staff of the director and vice-president in charge of producing and exploration for Standard Oil Co. of California, in San Francisco. Kipp succeeds **Wayne E. Glenn,** production manager for Continental Oil Co., Houston. New vice-presidents for 1961 are **Milton E. Loy,** southeast area manager for Schlumberger Well Surveying Corp., in New Orleans, and **L. P. Whorton,** research manager for research and development laboratories of Atlantic Refining Co., in Dallas. New members of the board include: **Robert G. Parker,** central regional production manager for Continental Oil Co., Oklahoma City; **Sidney B. Richards,** division engineer for the Canadian division of Pan American Petroleum Corp., Calgary; and **Hal M. Stanier,** northern district production manager for Sunray Mid-Continent Oil Co., Bakersfield, Calif.

E. M. Kipp

C. T. Carter

CHARLES T. CARTER has been elected vice-president of Sinclair Pipe Line Co. He will continue as director of engineering, and as a director of the company, at the firm's general office in Independence, Kan.

WALTER E. MacDONALD has been named manager of negotiations for Pan American International Oil Corp., New York. He joined the company in September, 1958, as a member of the law department. He was formerly with American Overseas Petroleum, Ltd., and the U.S. Dept. of Justice.

W. E. MacDonald

J. F. Beardslee

JOHN F. BEARDSLEE will manage the new department formed by the consolidation of Derby Refining Co.'s crude oil purchasing and pipeline departments, in Wichita, Kan. He was formerly manager of crude oil purchasing. **L. E. (Ed) Woods,** formerly pipeline superintendent, will be assistant manager of the consolidated departments. Derby is a division of Colorado Oil & Gas Corp.

HARRY D. CAMPBELL has been named president of McElroy Ranch Co., succeeding **Edward J. Brook.** Campbell, who was president of Franco Western Oil Co. prior to its merger with McElroy on Jan. 1, will continue to have headquarters in Bakersfield, Calif. Brook will continue as assistant to the president of Franco Wyoming Oil Co., parent concern.

W. R. Stott

W. A. Greeven

P. J. Anderson

WILLIAM R. STOTT, vice-president and a member of the board of Standard Oil Co. (N.J.), has been elected an executive vice-president and member of the executive committee. **Paul J. Anderson** and **W. A. M. Greeven** have been nominated for election to the board at the company's annual meeting, to be held in May. Anderson is the company's representative for the United Kingdom and Scandinavia and its Middle East representative in London. Greeven is regional coordinator for Europe, the Mediterranean area, and West Africa. Stott, a marketing executive for most of his 32 years with the Jersey organization, succeeds **Emile E. Soubry,** who plans to retire as a director in May. Soubry has already relinquished his executive vice-presidency and membership on the executive committee. **Peter T. Lamont,** a vice-president and director with 39 years service with the company, will also retire. And **Stewart P. Coleman,** a vice-president and director, is retiring Apr. 1.

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THE GASOLINE TAX DECISION that Congress must make in the not-too-distant future admittedly is a sticky one, which is loaded with politics, pressures, and no end of pros and cons.

But to our way of thinking there can be only one answer.

President Kennedy's recommendation notwithstanding, Congress is honor-bound to let the fourth cent of the federal tax on gasoline expire June 30, as it promised in the fall of 1959.

And every man and woman dependent on the oil industry is duty-bound to remind Congress of this pledge at every opportunity.

THE INDUSTRY IS GOING TO FIGHT the Kennedy proposal tooth and nail, starting with next week's hearing before the House Ways & Means committee. And this is what should be done, with all the vigor and persistence that can be mustered for such a cause.

Motorists have been getting the short end of the stick for years—and there has to come a time when this stops. Gasoline taxes already exceed 50% of the retail price in many states—a rate that is far beyond that of even so-called luxury taxes.

True, everyone is in favor of good highways and an interconnecting system of fine roads from coast to coast. But why should the motorist be shortchanged and hit on the head the hardest to pay the bill? As API's Frank M. Porter pointed out last week, "Any proposal to continue the temporary gasoline tax is unjustified, so long as another $1.7-billion in highway-user taxes are being diverted annually to nonhighway use."

The fourth cent of the federal tax produces about $600-million a year. And President Kennedy's proposals to hike taxes on diesel fuel, trucks, tires, inner tubes, and tread rubber will raise an estimated $300-million a year. This adds up to $900-million a year—or slightly more than half of the total of highway-user taxes that are now being diverted into the general treasury.

INDUSTRY REPRESENTATIVES have contended right along that the only fair and equitable solution to the financing dilemma is to use highway taxes for highway purposes. On this point we heartily agree. And if this should be done this spring, instead of compounding the burden on motorists, the federal highway program could be kept on schedule, and could be paid for on a realistic pay-as-you-go basis.

The penny increase that Congress approved reluctantly in September, 1959, was labeled a "temporary" increase. Temporary taxes have a bad habit of becoming permanent fixtures. Let's make sure that this one doesn't follow the pattern of the past.

this Dowell tool has revolutionized well completion, stimulation and workover practices

Seldom in the history of the oil industry has there been a tool as versatile as the one used in Abrasijet*.

By directing high-velocity streams of abrasive in liquid against casing or hole wall, Abrasijet can perform many jobs not previously considered practical. First and most important, Abrasijet can be used to cut slots in casing and formation at low cost. By moving the tool during jetting, either vertical or horizontal slots may be cut to reduce breakdown pressures and to initiate fractures in the direction and plane desired. This use of Abrasijet has resulted in excellent gas/oil and water/oil ratios as well as outstanding production increases.

Second, Abrasijet has been successful in perforating wells that could not be perforated using explosives. Several thicknesses of pipe and cement can be penetrated simply by adjusting the jetting time.

Third, Abrasijet can be used in old wells completed in open hole to clean formation faces that have become plugged with various soluble and insoluble deposits. Since Abrasijet is mechanical in action, a detailed chemical analysis of the plugging deposit is not required.

Finally, there is a special money-saving application of Abrasijet. A tool with downward-pointing jets can use acid without sand to dissolve set cement in casing or tubing. In many cases this is safer and less costly than drilling out.

For detailed information on this versatile service—call Dowell. Dowell services and products are offered from more than 150 offices and stations in the United States, Canada, Venezuela, Argentina, Germany, France and the Sahara area. Dowell, Tulsa 1, Oklahoma. *DOWELL SERVICE MARK

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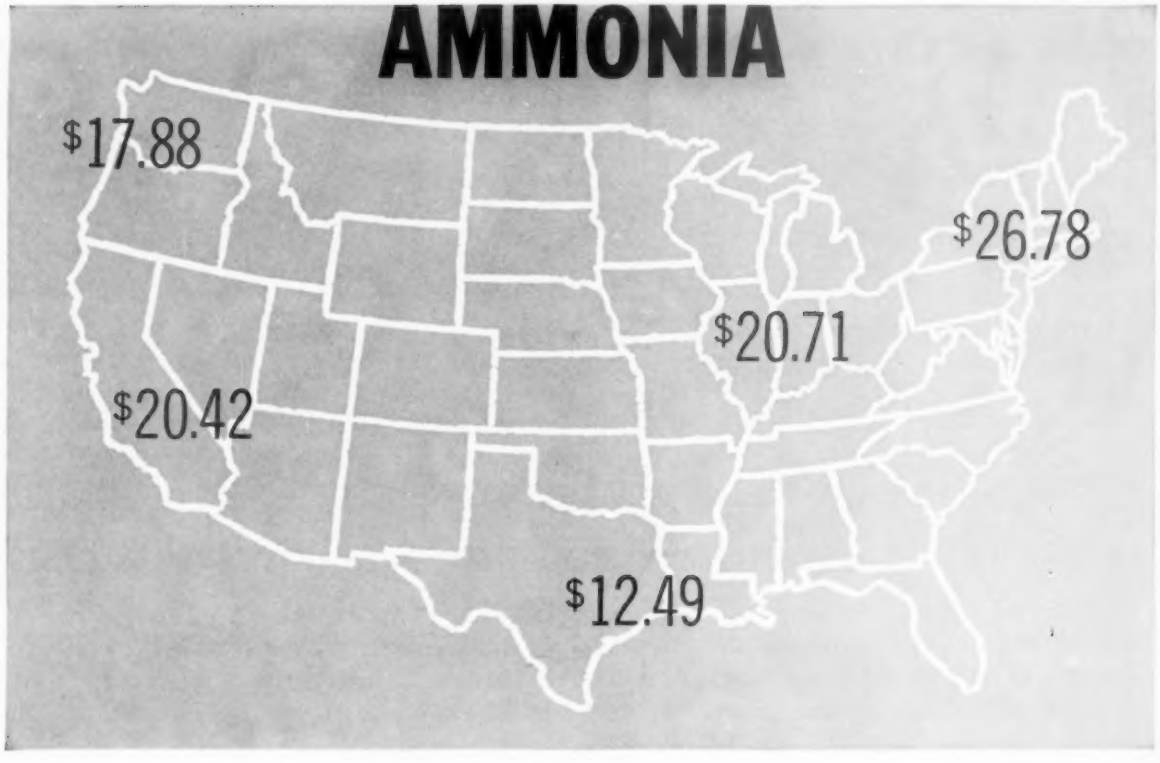

Kellogg Steam Methane Reforming Process Sets New Lows in Direct Operating Costs

Wherever you may be planning a new ammonia plant—for ammonia alone or as a component of a complete fertilizer complex, recent developments in Kellogg Steam Reforming now make a Kellogg-designed ammonia plant more economical than ever to operate as well as to build.

The figures shown above are direct operating costs per ton for five major U.S. areas. They are based on rates given in the utility table (right). Catalyst and chemical consumption have been included—at 34¢ per ton of ammonia product and 7¢ per ton, respectively. Labor, maintenance, taxes, insurance, depreciation and interest have not been included since these vary with individual client situations.

Feedstock for the process in this case is natural gas. Comparable low operating costs are possible with refinery gas feed, or even naphtha, under certain circumstances.

For a detailed description of Kellogg's ammonia process and other data, write for the new 12-page booklet—"Ammonia".

UTILITY UNIT COSTS*

	EAST COAST	GULF COAST	MID-WEST	PACIFIC NORTHWEST	WEST COAST
Natural Gas—Feedstock and Fuel, ¢/MM Btu	59	20	40	38	37
Electric Power, ¢/KWH	0.7	0.6	0.8	0.5	0.9
Cooling Water, ¢/M Gals.	2.4	1.8	2.5	2.2	2.2
Steam, ¢/M Lbs.	65	32	67	56	56

**Cost of steam is based on minimum fuel cost for each area*

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